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WOOD PANEL INDUSTRY INSPECTION

GUIDANCE DOCUMENT

Multimedia Enforcement Division

by

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CHAPTER ONE

INTRODUCTION

PURPOSE

The purpose of this document is three-fold. The first is to act as a guidance document for Regional, State, and local environmental agency inspectors conducting inspections of wood panel facilities. Second, this document was designed to provide inspectors with a consistent basis upon which to gather information for compliance tracking purposes. Third, the document will assist the inspector in conducting a comprehensive multimedia environmental compliance inspection. In the event that anyone using this document has technical questions regarding the information in this document or wood panel manufacturing, in general, Mr. Laxmi Kesari is available for assistance at (202) 564-6046.

ORGANIZATION AND USE

This document is organized by wood panel manufacturing process type. The four major categories of processes -- oriented strand board (OSB), medium density fiberboard (MDF), plywood (PW), and particleboard (PB) -- are discussed. Included with each process discussion are the typical process equipment, operating parameters, and emissions. Air pollution control devices are also reviewed including current technology and emerging technology. Additionally, pre-inspection, inspection, and air pollution control equipment checklists, along with typical equipment operating parameters, have been included in the appendices (Appendix A, B, C, and D, respectively).

This document was designed to be used as a supplement to existing procedures for conducting environmental compliance inspections. The checklists that have been included in this document are not necessarily exhaustive and are intended to initiate the investigation during the inspection. In order to conduct a comprehensive and effective inspection it is imperative that advance preparation be made. Facility permits, applicable regulations, and agency archives, and other records must be reviewed prior to conducting the inspection in order to determine and understand the requirements under which the compliance status of the targeted facility will be determined. Appendix F describes the applicability of some potential Federal regulations which may be applicable at the wood panel facilities which will be inspected. Furthermore, the most basic form of inspection preparation involves the anticipation of accidents and emergencies. Appendix G describes inspection health and safety guidelines. Following the inspection, an inspector will be expected to record all observations and reading from the site visit for possible enforcement follow-up. It is important that all notebook information, diagrams, and equipment readings collected be recorded into a document in an orderly and comprehensive fashion. Appendix H illustrates an inspection guide and report format which an inspector may choose to modify or follow for his or her own purposes.

INFORMATION SOURCE

The information in this document has been compiled based on information that has been collected from Clean Air Act Section 114 Information Requests and plant inspections of the wood panel industry.

CHAPTER TWO

PROCESS DESCRIPTIONS

The following section discusses general information regarding wood panel manufacturing. Information which is specific to a particular wood panel process is detailed later in this chapter.

GENERAL WOOD PANEL MANUFACTURING PROCESS

Wood panel plants generally employ six steps in the manufacture of panel: log/wood preparation, drying, resin blending, mat forming, pressing, and panel finishing. Logs are transported to the facility by truck or train. They are unloaded by cranes and stored in rows of piles. The logs are allowed to air dry for a period of up to several weeks (depending on their age, wood type, and estimated moisture content) before they are moved from the inventory piles to the loading area where they are fed into the debarker. Some facilities place the logs into hot ponds to prepare the bark for processing.

The logs are debarked by a rotary drum debarker or ring debarker. The drum debarker forces the logs to rub against each other, while the ring debarker thrusts large metal rings against the logs. Once debarked, the logs are trimmed to a length of 32 to 33 inches by a slasher saw. The shortened logs or bolts are sent to be processed into wood of size and other characteristics dependent upon the process.

The dryers employed at wood panel facilities, except for Plywood (PW) and Medium Density Fiberboard (MDF) facilities, use one of two drying designs, single-pass or triple-pass. The single-pass dryer consists of a heated rotating cylinder which dries the wood as it travels along the length of the dryer in parallel with heated air. In a triple-pass dryer, the wood is dried as it travels the length of the dryer, makes a 180 ° turn, travels back to the dryer inlet end, makes another 180 ° turn, and again travels the length of the dryer to the end opposite of the inlet. The wood travels in parallel with the heated air. Dryer temperatures, for both single-pass and triple-pass dryers, are dependent upon the process, the input wood moisture content, and the individual facility. PW facilities utilize multi-section forced air and/or steam-fired dryers, with the veneer carried on conveyor belts. Dryers are generally the bottleneck in PW plants, especially if dryers are steam-heated.

The dried wood and dryer exhaust gases pass through primary and secondary cyclones to remove any particulate waste. The cyclones remove particulates by imparting radial acceleration to the air, forcing the particulates against the outer wall of the cyclone chamber. The primary cyclone removes the larger particles allowing the smaller ones to pass through to the secondary cyclone which removes the finer particles. If an additional air pollution control device is added in series to the cyclones then the exhaust stream from the secondary cyclone is diverted to the air pollution device. The particles are directed to the boiler for use as auxiliary fuel, and the dried wood to a conveyor to the blenders. At the blender, wood is mixed with thermoset resin, wax, and other additives. Three resin types are used in the wood panel industry -- phenol formaldehyde (PF), urea formaldehyde (UF), and methyl diphenyl diisocyanate (MDI, also known as methylene biphenyl isocyanate).

Different resin formulations are used to vary panel characteristics, such as strength and durability. Waxes are generally added for water repellency, and dimensional stability. Facilities employ a weight or volume system to ensure the correct ratio of wood to resin. The resin, wax, and other additives are mixed on site in vessels with lines into the blender.

Resin-coated wood is conveyed to formers. The wood is formed into mats of consistent size and density. The formers are usually equipped with weight and volume meters to ensure uniformity. Mats are then cut by a flying saw as the mat is in motion or a stationary chopper. The mats are conveyed to the press loading area.

Although some facilities do utilize a single opening press, most facilities have employed a multiple opening press where each mat is separated by a press plate. The press is a keystone for Medium Density Fiberboard (MDF), Oriented Strand Board (OSB), Plywood (PW), and particleboard (PB) panel production processes. Production is dependent upon press timing. Time spent loading, unloading, and pressing directly impacts the overall production. As the press opens, the mats are shuttled into the press. The press uses hydraulic power (pressure) and heat provided by steam, thermal oil, or radio frequency (RF) to press panels. The press is designed to help cure the resin while also increasing the density of the product. Press temperatures, pressures, and residence times are dependent upon the process and individual facility.

After the press is unloaded, the panels are conveyed to a finishing area. A visual inspection of the board is conducted for the purpose of grading the boards and removing under-quality boards from the production line. Additionally, inspection of the boards at this point in the process allows facility personnel to be alerted to problems with the press. The panels are shuttled to a finishing saw where the rough edges are removed as the boards are sized. Panel sanding can also be done. The trim, sawdust, and sander dust are recycled as fuel for the boiler. Reject panels are sent to a hammermill for reduction to fuel for the boiler.

The boards are then stacked, painted with protective edge sealer and corporate/grading identification, and packaged for shipment.

ORIENTED STRAND BOARD

Manufacturers of Oriented Strand Board (OSB) are categorized under the Standard Industrial Classification (SIC) code 24931. OSB is a flakeboard product which utilizes either hardwood or softwood with the wafers or strands of wood meeting a size definition oriented at 90 ° angles by layer. This arrangement provides greater strength compared to the randomly oriented wafers in waferboard. Figure 2-1 illustrates a flow diagram of the OSB process. Within the wood panel industry, OSB facilities are typically found to have been built in the 1980s. A typical OSB plant may have an average annual production of between 160 and 340 million square feet (MMSF) of finished product, measured on a _ inch basis. OSB panels range from ¼ to 1 7/16 inches in thickness.

The logs or bolts are sent to a chipper or waferizer to be cut by engineered knives along the grain into small wafers approximately 2.75 to 4 inches long by 0.25 to 1.5 inches wide by 0.025 to 0.028 inches thick. The consistent size allows the wafers to be oriented in the final product. Although some facilities bring in precut wafers made at other plants, the choice of obtaining wafers instead of logs is often economically based. Wafer shipments often contain significant amounts of wood scrap, fines, and dust which cannot be used except as boiler fuel.

Wafers are generally stored in open piles where significant drying can occur due to biological and chemical action over just a couple of days. The wafers, which still contain most of their original moisture content, 30 to 50 percent (wet basis), are stored in a "wet" or "green" bin before being fed to the dryer. The dryer will reduce the moisture content to 1 to 10 percent (wet basis).

Some OSB plants employ a preheating device (pre-dryer) which elevates the temperature of the wafers to the desired temperature prior to drying with a single-pass dryer. The outlet temperature for the OSB dryers varies between 220°F and 240°F. The typical temperature within the dryer ranges from 800 °F to 1600°F. The residence time in the dryer for the wafers is typically 2 to 3 minutes.

After drying, the wafers are sent to an air classifier, which separates them by size and quality. Long wafers will be used in the surface layer, short in the core layer. The core wafers are coated with a faster curing resin which provides strength, while the surface wafers are coated with a slower curing resin to allow the interior moisture to escape. Some OSB facilities use dry resin systems which requires less drying of the wafers and takes advantage of the extra moisture in the wafers to make the resin wet.

The resin-coated wafers are placed on a continuous belt to be transported to mat formers where core layers are situated between two surface layers. OSB is most often made of three or five layers. An orienting device lays the wafers in the appropriate direction -- perpendicular to the previous layer. The surface layers are parallel to the belt. The orientation of the wafers is done by mechanical or electrostatic means. The mat is then cut into segments approximately sixteen to twenty-four feet long by eight feet wide by two to ten inches thick.

The press loader will load between eight and sixteen mats depending on the thickness and finish desired of the finished boards. Thicknesses range from ¼ to 1½ inches. The pressure ranges between 825 to 1800 psi depending on the panel strength and thickness desired. The pressing process (loading, pressing, unloading) takes between 3½ and 5 minutes. The time the mat is subject to elevated pressure and temperature is approximately 3 minutes. The temperature range in the press ranges between 205 and 500 °F depending on the type of resin used. The pressed OSB board is approximately _ the thickness of the formed mat and has a board density of 32 to 50 lbs/ft^3.

Some panels are tongue-and-grooved or cut for specialty use. The panels can then be coated with a thermoset acrylic latex to protect the wood from moisture and increase their longevity.

Some OSB plants utilize an UV coating treatment to add durability and water resistance to the board.

In addition to the more common dry OSB process, a wet OSB process is occasionally utilized. The wet OSB process involves wafers which are washed, then mixed with the resin, wax, and additives. A slurry mat is sent to the press where liquid and gases are pressed out. The pressed mats are then baked to bone-dry and rehumidified.

MEDIUM DENSITY FIBERBOARD

Medium Density Fiberboard (MDF) is the most popular reconstituted wood or lignocellulosic fiber panel manufactured. Manufacturers of MDF are categorized under the SIC code 24933. Other fiberboard types include hardboard and insulation board. Typical MDF mills produce between 40 and 200 MMSF per year (_ inch basis). Studies indicate that most facilities were built in the 1980s. Figure 2-2 illustrates a flow diagram of a typical MDF facility.

Plants can use wood furnish (by-product of other wood facilities) or logs in the production of MDF. Wood furnish (wood chips and sawdust) is received by truck and train and deposited into one common bin. The truck or railcar empties the chips or sawdust into a bin which then takes the furnish by conveyor to the mill for processing. Since a common bin is often used for both sawdust and wood chips, the bin must be completely empty of one type before the other is loaded. The sawdust and chips are taken from the receiving bin by conveyor to the storage area where they are deposited into piles, scooped up by front end loaders, and dumped into process bins.

The MDF production process begins with screening of wood chips and wafers to remove undesirable chips and foreign objects. The furnish is then washed in water to remove dirt and other debris. The cleaned chips are conveyed to pre-steaming bins which heat and loosen the wood fibers. After steaming, the chips are sent to a digester or refiner where the chips are subject to a temperature of approximately 300 °F and pressure of 90 to 100 psi for 3 to 4 minutes. Under these conditions the chips disintegrate into fibers.

The separated fibers enter a blow line where wax, formaldehyde scavenger, and UF resin are blended with the fibers. The wax coats the fibers to prevent them from absorbing too much resin. Fibers exiting the blow line may contain approximately 7.8 percent resin by weight.

The resin-coated fibers enter a flash-tube dryer, (steam or thermal oil heated drying tube) where they are dried to approximately 8½ to 9 percent moisture (wet basis). The temperature ranges from 135 to 440 °F. The fibers are then stored in dry storage bin.

From the dry storage bin, the fibers are sent to a former where they are spread on a continuously moving mat 1 to 3 inches thick, 5 to 8 feet wide, and up to 25 feet long pre-compressed by a system of belts and rollers. The mats are then fed into the press which is capable of producing panels between _ and 1½ inch thickness. The press operates at temperatures of 300 to 500 °F and a pressure of up to 2000 psi. Entering the press, the mats contain between 7½ and 8½ percent moisture (wet basis). During pressing, the moisture content of the mat is reduced to between 3½ and 4½ percent (wet basis). The pressed board density is approximately 40 to 50 lbs/ft^3.

Panels exiting the press are cooled and prepared for finishing. Horizontal board coolers are often used to allow the board to cool at the ambient temperature.

PLYWOOD

Plywood (PW) is a building material consisting of veneers (thin wood layers or plies) bonded with an adhesive. The outer layers (faces) surround a core which is usually lumber, veneer, or particleboard. PW has many uses, including wall siding, sheathing, roof decking, concrete formboards, floors, and containers. PW is usually made from softwoods such as Douglas Fir or Southern Pine. PW can be made from hardwood, but makes up only a small percentage of the total PW production. Hardwood PW manufacturers are categorized under SIC code 2435 and softwood PW manufacturers are categorized under SIC code 2436. In 1987, plywood and veneer production amounted to 1,560 million cubic feet [MMft ^{3}], consisting of 1,490 MMft ^{3} of softwood, and 70 MMft ^{3} of hardwood. Most facilities were built in the late 1960s or early 1970s, with no recent construction documented. Figure 2-3 illustrates a flow diagram of a typical PW facility.

The logs are cut into eight foot long block by a slasher saw. Crooked pieces of wood are cut to shorter lengths to produce a block of uniform dimensions, which is important in the veneer cutting process.

Once log uniformity is established, the blocks are then debarked. Several methods can be used for debarking logs. Ring debarking, as described earlier, is the most common process. Rossing head debarking engages a head which rides along a log stripping it as the log rotates. This is often used in low production mills, or on logs which are crooked or oddly shaped. Hydraulic debarking is for large, old-growth logs with thick, heavy bark. This device uses high pressured water to force the bark off the logs. This type of debarking system is not common as it is extremely expensive to perform the water treatment needed to meet environmental regulations.

The debarked blocks are heated in hot ponds of 170 to 200 °F by water for up to 8 hours to soften the wood in preparation for cutting. This process not only softens the wood, but also improves the surface quality of the finished product as the lathe is able to cut a smoother, thinner, and more uniform veneer.

Two major ways of producing veneer are cutting and peeling (rotary cutting). The veneer/plies are thin wood layers of 1/8 inch in thickness. Most veneer is produced by peeling. The peeling is accomplished on a veneer lathe. Slicing is used for production of decorative veneers from high quality hardwood and is seldom used with softwoods. Whether the wood is cut by lathe or a slicer, the wood is forced under a pressure bar which compresses the wood as it hits the cutting edge of the knife. During the slicing, the wood is clamped to an oscillating carriage which cuts on the down stroke. In a rotary lathe, the logs rotate continuously against a fixed roller bar and a floating lathe. The lathe cuts a continuous layer of veneer of constant thickness. A fundamental aspect of producing veneer in a high-speed production mill is an automated means of loading the lathe allowing the lathe to peel the veneer from the log in approximately 10 seconds. Veneer stripping rates range from 300 to 800 ft per minute. The portion of the log too small to be peeled by the lathe is shipped off as a landscaping log.

The veneer is then clipped to usable lengths. Clippers are high-speed knives that chop the veneer ribbons. Clipping is done to obtain the maximum amount of unblemished veneer possible. In mills where it is done automatically, clipping speeds reach up to 1,500 lineal feet per minute. The veneer is cut to about 54 inches wide (about the width of a panel). Clipped veneer of less than 54 inches in size is commonly refereed to as a fishtail. The clipper employs a light system to detect flaws and determine where along the veneer to clip. Visual inspection and manual sorting of veneer by size and quality is done for the fishtail clippings.

The clipped veneer is taken through a dryer by means of a conveyor system which maintains a constant temperature of 300 to 500 °F. The dryers are constructed and expanded in sections. Dryers, typically, are ten to thirty sections. Often, the dryer is divided into several zones (usually three to twenty-four), with each zone comprised of several sections held at a constant temperature. Several zones may be set for the same temperature. In older dryers, air circulates through a longitudinal area parallel to veneer movement. Recent advances include a steam-heated jet drying system where air velocity between 2,000 to 4,000 feet per minute is directed through small tubes perpendicular to the veneer. The high velocity creates turbulent air on the surface of the veneer. This eliminates the layer of moist air which is often allowed to remain on the surface of the board in older drying processes. The use of microwave energy, high temperature preheaters, and increased drying temperatures may be found in some facilities; however, in most softwood veneers, increased temperatures may have adverse effects in relation to glueability. After drying to 10 to 15 percent moisture, the veneer is manually sorted by quality and size based upon visual inspection. Dryers are the bottleneck in the production process.

The PF or UF resin is applied to the veneers which are then glued together forming a panel which may be 3 to 5 layers thick. Often the resin is applied to both side of an interior veneer. Generally, PW has two surface layers made of whole veneer enclosing one or two core layers made of plies which are at least 34 inches in width and have at least 53 inches clear length of good material (no holes, gaps or rotten spots). Each layer is laid perpendicular to the previous layer. The number of layers depends, primarily, upon the desired finished product thickness.

A recent development in PW manufacturing is the introduction of resins which may be applied to wet surfaces, thus increasing productivity by decreasing the drying time. This process of applying adhesives to veneers, assembling and gluing veneers into a panel, and moving the panels in and out of the press is considered to be the most labor intensive process in the manufacturing of PW. Because of this, many major advances have been made toward the automation of this stage.

PW is often prepressed in a cold press at low pressure to set the veneer layers. The panel is then heated in a press under high pressure and temperature to help the resin cure and bond the panels correctly.

PARTICLEBOARD

Particleboard (PB) manufacturers are categorized under SIC code 24931. Particleboard is made of small wood particles of nonuniform size randomly oriented, held together with a resin to form a mat. PB differs from OSB in that the particles are not of a consistent size nor are they specifically oriented. The construction of PB facilities in the United States generally took place in the late 1960s or early 1970s. The annual production capacity of PB plants range from 11 to 350 MMSF on a ¾ inch basis. PB ranges from _ to

¾ inch in thickness. Figure 2-4 illustrates a flow diagram of a typical PB facility.

Raw materials used by PB plants can be either green (50 to 55 percent moisture) or dry (18-25 percent moisture) wood chips, planer shavings, and sawdust. If needed, these particles are reduced in size by hammermills and refiners. Either hardwood or softwood can be used as raw material.

The use of urea formaldehyde resin in the production of PB requires that usage application be limited to interior use only and are not used for structural use or sheathing purposes. However, PB made with phenol formaldehyde resin, an exterior-type water resistant adhesive, is used for structural uses such as flooring and siding due to the stronger binding qualities of this resin.

Some facilities use a single-pass predryer in which the particles are subject to temperatures up to 1000 °F, reducing moisture from 50 to 60% (wet basis) to 30%. The predryer is designed for parallel air and particle flow with flights to lift the particles up into the heated air which moves the particles toward the exit. The particles settle at the bottom of a 90 ° elbow turn as the air escapes upwards. The dryer operates with an inlet temperature ranging from 400 to 1600 °F drying particles to a moisture content of 2 to 5 percent (wet basis). Outlet temperatures range from 150 to 200 °F.

After drying, the particles, are conveyed to the screening process where horizontal vibrating screens or a gyratory system remove the "fines" which would absorb excess amounts of resin. The fines are directed to the boiler to be used as fuel.

The wax is usually sprayed on the particles as they are conveyed to the blender, or sprayed on fibers being air-conveyed through blowpipes to the formers. The resin-coated particles are formed by spreading or felting of the particles in a uniform mat.

The mats are conveyed to a press for product formation. The press applies 600 to 2500 psi at 200 to 320 °F over a 3 to 5 minute range. The pressed board density is 28 to 62 lbs/ft^3.

Most often secondary finishing steps which are included in the production of the final product include painting, laminating and edge finishing. These secondary steps can only be done after the PB has cooled to room temperature.

Figure 2-1

ORIENTED STRAND BOARD FLOW DIAGRAM

Figure 2-2

MEDIUM DENSITY FIBERBOARD FLOW DIAGRAM

Figure 2-3

PLYWOOD FLOW DIAGRAM

Figure 2-4

PARTICLEBOARD FLOW DIAGRAM

CHAPTER THREE

PROCESS EQUIPMENT AND EMISSIONS

INTRODUCTION

Within the Wood Panel Industry, information regarding process conditions and potential emissions have become increasingly available due to industry research, facility stack test results, and industry surveys among other sources. In March, 1971 and in July, 1972, Washington State University released information indicating that PW dryers emitted a significant level of volatile organic compound (VOC) emissions. In 1972, however, most facilities were not reporting VOC emissions from the dryer (or any other process equipment) in facility-wide emission estimates.

Various tests have been conducted by the industry for VOC, formaldehyde, and phenol emissions from dryers and presses. The industry association, the National Council of the Paper Industry for Air and Stream Improvements, Inc. (NCASI) published Bulletin No. 405 ("A Study of Organic Compound Emissions from Veneer Dryers and Means for Their Control") in August, 1983 which indicated the potential for VOCs from veneer dryers. Several facilities identified VOCs in permit applications in the early 1980's. NCASI issued three additional bulletins in 1986 (No. 493, No. 503, and No. 504) indicating a potential for VOCs from dryers and presses at OSB facilities. In 1989 and in 1994, NCASI published bulletin Numbers 89-05 and 657, respectively on particulate matter (PM) emissions in the OSB industry. Furthermore, in May 1983, EPA published "Control Techniques for Organic Emissions from Plywood Veneer Dryers" which also addressed the fact that VOC emissions were found to be emitted from plywood dryers.

Whether it be an OSB, MDF, PB, or PW plant, emissions are of great concern. The dryer, press, and boiler all are major sources which emit emissions and must be accounted for in the inspection process. For the best representation of the actual emissions at a facility, it is recommended that the facility conduct an emissions stack test using test methods as required in the Federally-approved State Implementation Plan (SIP) and/or Federal regulations. Further, in the wood panel industry, a series of modifications exist which can potentially be made to increase or decrease emissions. Appendix I lists some of the modifications and their impact on overall plant emissions.

DRYER

OSB, MDF, PB, and PW plants use dryers to reduce the moisture content in wafers, chips, fibers, or veneer. No matter what type of drying system is used, the dryer itself is one of the leading causes of emissions violations within panel plants. The key parameters in operating dryers which most greatly affect the emissions of PM and VOCs are the wood species, dryer temperatures, and the feed rate to the dryers. The dryers are heated with the exhaust from the boiler or equipment used in other processes. Some dryers use oil heated in a thermal oil heater (TOH). Other dryers have auxiliary heat sources, exclusive to the dryer, which help maintain constant dryer temperature.

Oriented Strand Board

OSB plants employ triple-pass or single-pass dryers. Some plants have several dryers connected in parallel. Both types of dryer systems maintain inlet temperatures of approximately 600 °F to 1200°F.

Operating parameters which affect the emissions of PM-10 and VOC from the dryers are: dryer inlet temperatures and dryer loading rate. The higher the temperature and the greater the dryer load is, the higher emissions will be. These parameters are also interdependent, since the larger the load is, the higher the temperature must be to ensure adequate drying. Two characteristics of wood wafers which influence emissions are wood species and moisture content. Since a variety of both hardwood and softwood are used to produce OSB, the VOCs latent in the wafers varies considerably. Softwood is more prone than hardwood to emit VOCs; however, since softwood species vary considerably in their potential to emit VOCs, a wide range of emission potentials exist in the softwood area. Additionally, hardwood may contribute more inorganic PM_{10}. The initial moisture content of the wafers is also a factor in calculating VOC emission potential as the dryers serve the purpose of drying the wafers and can be used at lower temperatures if less drying is needed.

Stack testing has demonstrated that the rate of aerosol formation and VOC emissions is proportional to dryer temperature. As the wafers stay in the dryer longer or are exposed to higher temperatures, hydrocarbons (VOCs) and carbon monoxide are emitted. These emissions condense resulting in characteristic blue haze. In January, 1994, NCASI released "A Study of Volatile Organic Compound and Condensible Particulate Matter Measurement Methods Used On Furnish Dryers In the Oriented Strandboard Industry" Technical Bulletin 657. In this document, NCASI indicated that as dryer inlet temperatures increase, the concentrations of VOC, PM, condensible particulate matter, and formaldehyde increase. However, their study indicated for dryer inlet temperatures of 850 °F to 1200°F "attempts to control (or reduce the rate of release of) VOCs by lowering dryer inlet temperatures may result in an increase in PM and condensible particulate matter (lb/ton basis). Nitrogen oxides and carbon monoxide may also increase, as a larger volume of air will have to be heated for an equivalent amount of wood." (NCASI Bulletin No. 657, page 31). Dryer burners are known to be major sources of NO_x. Also as dryer temperatures are increased so does the concentration of CO in the exhaust.

The control of particulate matter emissions from dryers at OSB facilities has been demonstrated through the use of several control technologies. Wet electrostatic precipitators or WESPs, as they are commonly known, have been demonstrated to have control efficiencies in the range of 80-90 percent. Electrified filter beds or EFBs, have also been demonstrated to be an efficient means of controlling particulate matter from dryers at OSB facilities. EFBs often collect just enough of the condensible organics generated in the OSB process to inhibit particulate matter control efficiency and deteriorate the pebbles, presenting O&M and performance problems. Generally, two main performance problems have been experienced with EFBs, operation uptime and adequate and consistent pollutant control efficieny. Although, WESPs and EFBs are approximately equal in their control of particulates from dryers, WESPs have the additional advantage of controlling some condensible VOCs. However, an advantage of the EFB is that it is a dry system and waste water treatment facilities are not necessary like they are for WESPs. Perhaps, the distinguishing factor are the higher operating and capital costs for WESPs. Scrubbers are an effective control against the particulate matter.

Medium Density Fiberboard

In a Medium Density Fiberboard (MDF) plant, there is only one system used to dry the fibers, flash tube dryers.

Operating parameters which affect the emission of PM and VOCs are dryer temperature and throughput, both of which were discussed in the previous section. The wood species and wafer moisture content also effect these pollutant emission rates. Of the facilities which were surveyed, either no control was used or cyclones followed by regenerative thermal oxidation units were used to control particulate matter, VOCs, and CO emissions.

Plywood

Veneer drying in PW plants consists of conveying the veneer through a heated chamber ranging in temperature from 302 °F to 500°F. In older roller dryers hot air circulated around the veneer in a longitudinal zone parallel to veneer movement. This method is still used with hardwood veneer. Most PW plants built in recent years, use what is known as jet dryers. These direct a current of air at velocities of 2000 to 4000 ft/min through a small tube against the surface of the veneer. This allows the heated air to penetrate the thin layer of gases escaping from the veneer, thereby accelerating the drying.

Organic aerosols, gaseous organic compounds, and small amounts of wood fiber are found in the emissions of veneer dryers. Aerosols begin to form as the gaseous emissions are cooled below 302 °F, although a large fraction of the emissions remain in the vapor state at 70 °F. At 70°F, most of the vapors are comprised of resin acids, fatty acids, and neutral sesqui and di-terpene compounds.

Operating parameters for veneer drying are the dryer temperature, drying time, steam pressure, speed of the conveyor, and veneer moisture content. If a piece of veneer is too moist, it will require higher temperatures, and more time to dry. This may be detrimental to the veneer as increased temperatures can have adverse affects on the glueability of veneer.

Particleboard

The PB manufacturing process usually utilizes rotary drum dryers. The average number of dryers within the PB manufacturing process is 2-dryers with feed capacities of 18,000 to 55,000 lbs/hr for each dryer. VOC emissions from PB dryers include turpenes, resin and fatty acids, and combustion and pyrolysis products. One study conducted on a typical PB plant determined that throughout the range of 550 °F to 950°F, small increases in the inlet temperature, produced relatively large increases in the emissions rate of particle matter (PM).

Generally, more PM and fugitive dust and less VOCs are expected from PB manufacturing processes than processes such as OSB and PW. This is due to the variable condition in which raw material is received at PB facilities. Raw material is received as green logs, shavings, sawdust, or trim with moisture contents from 18% to 30%.

PRESS

The press applies pressure and elevated temperatures to cure the thermoset resin, bond the pieces together and compress the panel. The press determines the quality and strength of the final product. The press and press area consists of a loading area in which mats are collected to be loaded into the press, plates on the top and the bottom of each opening, hydraulics, a heat source, and the unloading area where panels are removed from the press. Some facilities use press plates with decorative images for specialty products. Presses are usually heated by steam generated by the facility boiler. Hot oil heated by a thermal oil heater or radio frequency generators are also utilized to supply heat to the press.

Many plants have multi-opening presses with platens ranging in size from 4 ft by 8 ft to 8 ft by 28 ft. The multi-opening press may have as many as 40 openings. Some plants, however, have large single opening presses where several panel are compressed simultaneously between two plates. Due to the increased number of workers required to operate a single press and the reduced production rates compared to multi-opening presses, many plants are moving away from the single-opening press. Compared to OSB, MDF, and PB presses, PW presses are usually smaller and generally heated by steam.

The purpose of the press is to bring the mats close together so that the glue layer is very thin and even, and to heat the resin so it will polymerize. Resin systems must be carefully tailored to meet specific conditions in the plant. Both press time and temperature may be modified to suit specific conditions.

The operating parameters for the veneer press are press time and temperature. Press time is dependent on the temperature in such a way that when the temperature is increased, the amount of time needed is decreased, and vice versa.

In past years, manufacturers generally vented press emissions from the work area through roof fans and vents which draw the emissions toward the roof, out through the vents, and into the atmosphere. The press vents emit vapors of aldehyde compounds from the resin and the wood. More recently, however, the industry tendency is to install total enclosures hood systems to capture approximately 95% of the emissions for all pollutants, which consist primarily of VOCs. These emissions are then directed to air pollution control devices such as RTOS. Formaldehyde emissions have been reduced by some facilities by switching to methylene diphenyl diisocyanate (MDI) resins, or by formulating resins with less excess formaldehyde content. Formaldehyde emissions can be estimated by performing mass balance calculations. Currently, information is not available as to the number of vents required in relation to the number of press openings on each press. The estimated emissions for these roof vents varies by process and resin type, generally. Some facilities have constructed stacks over the press vents in order to determine concentrations of releases. However, since formaldehyde is a reportable Toxic Release Inventory (TRI) chemical, a mass balance may provide an indication of the releases of formaldehyde to the atmosphere.

As discussed above, presses, press residence time, and temperature vary by panel manufacturing process. **OSB** presses average 14-18 openings with hydraulic pressures of 825 psi to 1800 psi. Cycle times vary also with ranges from 4-5 minutes. MDF facilities utilize single presses with greater than twelve openings with hydraulic pressures up to 2000 psi. Cycle times vary from 2.8 minutes to 4.8 minutes. And PB facilities operate with one press, generally, and with between 14-20 press openings. Cycle times vary from 3 to 11 minutes producing boards with thicknesses from ¾ inch to 1 7/16 inch. Urea formaldehyde is used as the adhesive in the bonding of particleboards. Emissions from PB presses were quite limited and varied considerably from facility to facility.

Plywood presses, on the other hand, differ as described above. Most softwood PW plants, prepress the loads before final pressing or hot pressing. This is done in cold presses at lower pressure to allow the wet adhesive to tack the veneers together. For the facilities surveyed, phenol formaldehyde was the prominent resin being used as the adhesive.

Most of the PW facilities for which documentation exists have more than one press at the facility usually ranging from one to seven presses. Hot pressing is usually done in multi-opening presses ranging from 26 to 42 openings. A typical pressing cycle takes 2 to 7 minutes at hydraulic pressure of 1200 psi, producing boards from ¼ inch to 1-1/8 inch and board densities of 25 to 50 lbs/ft^3.
In general terms, 40-170 tons per year of fine PM and VOCs can be expected from the press depending on the process. High concentrations are also expected from the press since resin adhesives are used. And negligible or no emissions of CO and NO_x are expected from the press.

BOILER

Boilers are fired with wood waste including: wood scraps from other manufacturing processes, bark, trim, fines recovered in the negative pressure system and dryer cyclones, sawdust, reject boards (after a hammermill). Other fuel sources can include natural gas, oil, and tire-derived fuel. Energy needs for plant heating, particle or wood chip drying, and producing steam or hot oil to heat the press platens are met almost entirely by using process wood residues as fuel.

The amount of fuel burned, the airflow, and the operating temperature of the boiler are all operating parameters which have an affect on the level of emissions released. In wood-fired plants, the air pollutant of primary concern is particulate matter. CO and NO_x emissions are considerably less for wood-fired steam generators than for coal-fired boilers of comparable size, despite the fact that larger quantities of excess air are normally used in burning wood. Furnace design and operating conditions are particularly important when firing wood waste. For example, because of high moisture content that can be present in this waste, a larger than usual area of refractory surface is often necessary to dry the fuel before combustion. In addition, sufficient secondary air must be supplied over the fuel bed to burn the volatiles that account for most of thee combustible material in the waste. When proper drying conditions do not exist or when secondary combustion is incomplete, the combustion temperature is lowered and increased particulate, carbon monoxide, and hydrocarbon emissions may result. The lowering of combustion temperature generally means decreased nitrogen oxide emissions. Also, emissions can fluctuate over short periods if significant variations occur in fuel moisture content. When fuel oil is used as the fuel source for boilers, only a minor amount of VOCs and carbon monoxide will be emitted from the combustion of fuel oil. The rate at which VOCs are emitted depends on combustion efficiency.

A typical boiler in a plant will be equipped with a primary cyclone and some will have a multicyclone additionally, where fly ash is reinjected. There are many control devices which may be utilized to reduce boiler emissions. Many boilers are fitted with multicyclones, but fabric filters, tube-type wet ESP, venturi scrubbers and dry electrostatic precipitators are all effective devices which may be used in conjunction with one another to decrease emissions further. For example, a wet scrubber installed down stream of multicyclones is effective for the removal of particulates from the flue gas of wood fired boilers.

Oriented Strand Board

OSB plants are equipped with a single boiler, in most cases. However, depending on the size of the plant and its energy needs it is not uncommon to encounter a facility operating with two boilers. The average operating rate of boilers within this industry is 208.8 MMBTU/hr heat input. Using EPA Method 5, pollutants from a boiler operating at this rate are approximately 187 tons per year of particulate matter or 0.205 lbs/MMBTU.

Medium Density Fiberboard

Within MDF facilities, boilers operate with heat inputs from 196 to 372 MMBTU/hr producing emissions of particulate matter ranging from 252 to 840 tons per year, respectively.

Plywood

Boilers that are used in the PW process generally operate with heat input ranges of 50-180 MMBTU/hr while their maximum design heat input averages 115 MMBTU/hr. The emissions from boilers operating at the above stated heat inputs produce particulate matter emissions from 43 to 258 tons per year.

Particleboard

PB boilers are operated within a range of 20-57 MMBTU/hr on the average, although the actual maximum heat input to the boiler ranges from 50-169 MMBTU/hr on the average. The PM emissions ranged from 18 to 53 tons per year based on stack test-generated emission factors ranging from 0.18 to 0.56 lbs/MMBTU.

FUGITIVE AND OTHER EMISSION SOURCES

Area sources and point sources of emissions within the wood panel industry include cutting, sawing raw materials, sawdust piles, road dust, log debarking, log handling, and chipping. Although some of these emissions may not be quantifiable, such as road dust, others such as log cutting, sanding, debarking have been estimated by AP-42 to have a PM emission factor ranging from 0.02 to 0.4 lbs/ton. Emissions from road dust, debarking, and log handling may be minimized by using a dust suppression liquid. Frequently, emissions from cutting and sawing are directed to process cyclones and baghouses for control. Spray booths and coating/resin transfer operations generally install a ventilation or hood capture system for collecting emissions from these operations. Further, industrial motor vehicles emitting emissions have operated cleaner by using alternate fuel options and catalytic converters. State permit language frequently identify PM fugitive sources and require that some sort of control or procedure be implemented for *"minimizing"* emissions. The following list identifies some of the common sources and types of emissions at a wood panel facility:

Particulate Matter Sources

- Road dust
- Log handling
- Spray booths
- Coating/resin transfer
- Motor vehicles
- Trimming/lathing/sanding/sawing operations

VOC Sources

- Spray booths
- Coating/resin transfer
- Motor vehicles

NOx and CO Emissions

- Motor vehicles

CHAPTER FOUR

APPLICATION OF MULTIMEDIA INSPECTION GUIDELINES FOR WOOD PANEL FACILITIES

Presented here, are many of the significant tasks that must be included in each of the media specific inspections. Sample collection and inspection checklists are addressed elsewhere in this document. Media discussed include air, water, hazardous waste, toxic substances, pesticides, as well as emergency planning/community right-to-know and Superfund issues.

CLEAN AIR ACT

The Clean Air Act (CAA) is the legislative basis for air pollution control regulations. It was first enacted in 1955 and later amended in 1963, 1965, 1970, 1977, and 1990. The 1955 Act and the 1963 Amendments called for the abatement of air pollution through voluntary measures. The 1965 amendments gave Federal regulators the authority to establish automobile emission standards.

Basic Program

The Clean Air Act Amendments of 1970 significantly broadened the scope of the Act, forming the basis for Federal and State air pollution control regulations. Section 109 of the 1970 Amendments called for the attainment of national ambient air quality standards (NAAQS, 40 CFR 50) to protect public health and welfare from the known or anticipated adverse effects of six air pollutants (as of 1990 the standards were for small particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead). The states were required to develop and submit to EPA implementation plans that were designed to achieve the NAAQS. These state implementation plans (SIPs) contained regulations that limited air emissions from stationary and mobile sources. They were developed and submitted to EPA on a continuing basis and became federally enforceable when approved.

Section 111 of the 1970 Amendments directed EPA to develop standards of performance for new stationary sources. These regulations, known as New Source Performance Standards (NSPS, 40 CFR 60), limited air emissions from subject new sources. The standards are pollutant and source specific.

Section 112 of the 1970 Amendments directed EPA to develop standards for hazardous air pollutants. These regulations, known as the National Emission Standards for Hazardous Air Pollutants (NESHAPs, 40 CFR 61), limited hazardous air emissions from both new and existing sources. These standards are incorporated into the SIPs, usually by reference to the EPA standard.

The Clean Air Act Amendments of 1977 addressed the failure of the 1970 Amendments to achieve the NAAQS by requiring permits for major new sources. The permit requirements were based on whether the source was located in an area that met the NAAQS (attainment areas, 40 CFR 81) or in an area that did not meet the NAAQS (nonattainment areas). The permit program for sources in attainment areas was referred to as the prevention of significant deterioration (PSD) program.

The Clean Air Act Amendments of 1990 significantly expanded the scope of the Act. Section 112 amendments essentially replaced the NESHAPs with a new program called "Title III - Hazardous Air Pollutants." Title III listed 189 hazardous air pollutants and required EPA to start setting standards for categories of sources that emit these pollutants within 2 years (1992) and finish setting all standards within 10 years (2000). It also contains provisions for a prevention-of-accidental-releases program.

Title V of the 1990 Amendments requires EPA to promulgate a permitting program that will be implemented by the states no later than November 15, 1994. The permits will include enforceable emission standards, and reporting, inspection, and monitoring requirements.

Title VII of the 1990 Amendments gives EPA enhanced enforcement authority. The Agency may initiate enforcement proceedings for SIP and permit violations if the state does not take enforcement action. Title VII also provides for criminal penalties for Clean Air Act violations.

Evaluating Compliance

The following procedures are used to evaluate compliance with the Clean Air Act.

Before an on-site inspection the documents listed below should be obtained from state or EPA files and reviewed to determine what regulations apply and what compliance problems may exist.

- The state air pollution control regulations contained in the SIP (State regulations and permits form the basis for the air compliance inspection and will vary from state to state.)

- The state operating and construction permits

- The most current emissions inventory (check for so urces subject to SIP, NSPS, and NESHAPs requirements)

- The volatile organic compound (VOC) emissions inventory (The VOC inventory may not be included in the emissions inventory but reported separately under Title III Form R submittals. See Emergency Planning and Community Right-to-Know section.)

- The consent decrees/orders/agreements still in effect and related correspondence

- The most recent inspection reports

- The most recent monthly or quarterly continuous emission monitoring (CEM)/continuous opacity monitoring (COM) reports

- AIRS Facility Subsystem (AFS) reports

- Process descriptions, flow diagrams, and control equipment for air emission sources

- Facility plot plan that identifies and locates the air pollution emission points

The on-site inspection should include a review of the records and documents listed below:

- Process operating and monitoring records to determine if permit requirements are being followed

- Fuel analysis reports (including fuel sampling and analysis methods) to determine if sulfur dioxide emission limits and/or other fuel requirements are being met

- Reports of process/control equipment malfunctions causing reportable excess emissions (refer to SIP to determine reportable malfunctions and report requirements)

- Source test reports to determine if NSPS, NESHAPs, and/or major sources have demonstrated compliance with emission standards

- CEM reports to determine if NSPS and SIP reporting requirements are being met (reported emissions should be checked against raw data for accuracy and reported corrective actions should be checked for implementation)

- CEMS/COMS certification tests (relative accuracy and calibration drift) to verify that performance specifications at 40 CFR 60, Appendix B are met

- Records and reports specified in SIP regulations, NSPS and NESHAP subparts, and applicable permits

The on-site inspection should also include the following:

- Visible emission observations (VEOs), by inspectors certified to read smoke within the last 6 months, to determine compliance with SIP, NSPS, or NESHAPs opacity limits (document noncompliance with EPA Method 9, 40 CFR 60, Appendix A)

- A check of real time CEM measurements to determine compliance with SIP, NSPS or NESHAPs limits (opacity CEM measurements can be compared against VEOs)

- A review of CEM/COMS calibration procedures and frequency to determine if the zero/span check requirements and analyzer adjustment requirements of 40 CFR 60 are being met

- Observations of process and control equipm ent operating conditions to determine compliance with permit conditions (if no permit conditions apply, control equipment operating conditions can be compared to baseline conditions from stack tests or manufacturers specifications for proper operation)

- A review of all sources to determine if existing, new, modified or reconstructed sources have construction and operating permits required by SIP

(note other process changes that may not require a permit but could effect emissions)

- Observation of contr ol equipment operating conditions and review of equipment maintenance practices and records to determine proper operation of control equipment

CLEAN WATER ACT

EPA establishes national water quality goals under the Clean Water Act (CWA). Water pollution from industrial and municipal facilities is controlled primarily through permits limiting discharges. Permit limits are based on effluent guidelines for specific pollutants, performance requirements for new sources, and/or water quality limits. Permits also set schedules and timetables for construction and installation of needed equipment. Sources which discharge indirectly to a municipal treatment plant are subject to pretreatment standards. Other key provisions of the CWA require permits for discharge of dredged and fill materials into waters (including wetlands) and requirements for reporting and cleaning up spills of oil or hazardous material. Nonpoint sources of water pollution, such as runoff from agricultural fields, are addressed through programs to implement Best Management Practices.

Although the investigator(s) responsible for determining facility compliance with Clean Water Act requirements should focus on issues identified below, they should be aware of the inter-relationship with other laws, regulations, etc. For example, sludge generated at a wastewater treatment plant (WWTP) may be regulated under solid waste disposal laws (Toxicity Characteristic) and substances used/generated at the WWTP may be subject to reporting requirements (EPCRA reporting for chlorine).

Basic Program

Wastewater compliance components can be generally categorized into the following groups:

- Control and treatment systems
- Self-monitoring systems (including both field and laboratory measurements)
- Operation and maintenance (O&M)
- Best Management Practices (BMP)
- Spill Prevention Control and Countermeasure (SPCC) Plan

Before the inspection, the investigators should determine the "yardstick" by which facility compliance will be measured. To do so, the investigator must obtain and review copies of the discharge permit, permit application, discharge monitoring reports (DMRs), treatment facility plot plans, and any additional required plans (SPCC, etc.).

Evaluating Compliance

Control and Treatment Systems

Wastewater control and treatment systems should be evaluated for adequacy and compliance with permit or other requirements (consent decrees, etc.) through record review and on-site inspection. This includes, but is not limited to, the following:

- Determine if all wastewaters generated by the facility are adequately controlled, recycled, directed to the wastewater treatment plant (on or off-site), discharged through an outfall regulated by a National Pollutant Discharge Elimination System (NPDES) permit, etc.

- Identify any wastewater discharges directly to a receiving waterbody that are not included in a facility NPDES Permit.

- For off-site wastewater treatment, determine if the discharge is required to meet pretreatment standards. Review any applicable standards and appropriate wastewater characterization data, as necessary. Pretreatment checklists are available in some Regional offices.

- For on-site wastewater treatment, determine if the wastewater treatment plant has the appropriate unit processes and is properly sized to effectively treat the quality and quantity of wastewater generated by the facility.

- Review operations records and DMRs to determine if the facility has exceeded its NPDES permit limits.

Self-monitoring Systems

Self-monitoring consists of flow and water quality measurements and sampling by the facility in addition to laboratory analyses of water samples required by the NPDES permit program. The NPDES/pretreatment permits normally identify self-monitoring requirements. There are usually two components to the self-monitoring system evaluation, as discussed below:

Field - Confirm that acceptable sampling and flow measurements, as specified by the NPDES/pretreatment permits, are conducted at the correct locations, with the proper frequency, and by acceptable equipment and methods. Determine if all necessary calibrations and O&M are performed. Approved procedures are to be used in the collecting, preserving, and transporting of samples [40 CFR 136.3(e)].

Laboratory - Evaluate laboratory procedures affecting final reported results including:

- Sample preservation methods and holding times
- Chain-of-custody
- Use of approved procedures (40 CFR 136 or approved alternatives)
- Adequacy of personnel, equipment, and other components of laboratory operations
- Adequacy of quality assurance/quality control program
- Recordkeeping and calculations

Evaluate how the data are entered into laboratory notebooks or computers; sign-off procedures used; analysis of spikes, blanks, and reference samples; how the lab data are transposed onto the official, self-monitoring report forms (DMRs) sent to the regulatory agency; and the extent and capability of outside contract laboratories, if used.

Operation and Maintenance

Most NPDES discharge permits have standard language that requires proper facility operation and maintenance [40 CFR 122.41(e)]. The investigator should:

- Determine if wastewater treatment processes are operated properly through visual inspection and records review.

- Observe the presence of solids, scum, grease, and floating oils or suspended materials (pinpoint floc, etc.), odors, and weed growth in the treatment units. Note appearance of wastewater in all units.

- Identify all out-of-service processes and determine cause.

- Determine level of maintenance by observing condition of equipment (pumps, basins, etc.) and reviewing records (outstanding work orders, spare parts inventories).

- Identify handling, treatment, and disposal of sludges and other residues generated from processes and wastewater treatment system.

Best Management Practices (BMP) Plan

Determine if the facility handles toxic materials and if a BMP plan is required (40 CFR 125, Subpart K or by NPDES permit). If applicable, review BMP Plan or BMP Permit requirements. Determine if facility is following required provisions. Review any records required by the plan for adequacy.

Spill Prevention Control and Countermeasure Plan

Determine if the facility is required to develop and implement an SPCC Plan (40 CFR 112) for storage/handling and spill control of specified substances. A facility is required to have an SPCC plan if it stores oil and/or oil products and:

- Underground capacity exceeds 42,000 gallons
- Aboveground storage capacity exceeds 1,320 gallons
- Any single aboveground container exceeds 660 gallons
- A spill could conceivably r each a water of the United States

Obtain a copy of the plan and required records to assess compliance with the plan provisions. The plan should be certified by a registered professional engineer with approval and implementation certified by the proper facility official. Identify and visually inspect all regulated tanks and equipment including containment and run-off control systems and procedures. Investigate any evidence of spilled materials. Discuss training and associated procedures with facility personnel. Review applicable records (spill reports, tank and piping inspection reports, and loading/uploading equipment inspection reports).

RESOURCE CONSERVATION AND RECOVERY ACT

Basic Program

The Resource Conservation and Recovery Act (RCRA) of 1976 is the primary statute regulating the management and disposal of municipal and industrial solid and hazardous wastes. In 1984, RCRA was amended by the Hazardous and Solid Waste Amendments (HSWA) and in 1988 by the Medical Waste Tracking Act (Subpart J of RCRA). The principal objectives of RCRA, as amended, are:

- Promoting the protection of human health and the environment from potential adverse effects of improper solid and hazardous waste management

- Conserving material and energy resources through waste recycling and recovery

- Reducing or eliminating the generation of hazardous waste as expeditiously as possible

The RCRA program consists of four waste management sub-programs designed to meet the Congressional objectives: (1) Subtitle D - Solid Wastes, (2) Subtitle C - Hazardous Wastes, (3) Subtitle I - Underground Storage Tanks (UST), and (4) Subtitle J - Medical Wastes. This section discusses evaluating compliance under Subtitles C and I.*

Subtitle C, Hazardous Wastes

Evaluating Compliance

Under Subtitle C, hazardous wastes are subject to extensive regulations on generation, transportation, storage, treatment, and disposal. A manifest system tracks shipments of hazardous wastes from the generator until ultimate disposal. This "cradle to grave" management is implemented through regulations and permits.

The investigator must clearly identify investigation objectives, the RCRA regulatory authority (or authorities) with jurisdiction, and establish the facility status under RCRA. RCRA investigations

* *The waste management programs are presented here out of alphabetical sequence because Subtitle D contains the definition of "solid waste" which is helpful in understanding hazardous wastes in Subtitle C. Hazardous wastes are a subset of solid wastes. Subtitle C hazardous wastes are defined specifically in Title 40 of the Code of Federal Regulations (CFR), Part 261.*

may be performed for several reasons, including:

- Assessing RCRA compliance with regulations and permits
- Reviewing compliance status with respect to an administrative enforcement action
- Reviewing compliance with deadlines in a facility permit

- Responding to alleged violations and/or complaints
- Supporting case development

The regulatory agencies with RCRA authority may be EPA, a designated State agency with full or partial authority, local agencies working with the State, or a combination of the three.

In determining the facility status under RCRA, the investigator must decide whether the facility is a generator, transporter, and/or treatment, storage, and disposal facility (TSDF), and whether the facility is permitted or has interim status. Generally, EPA Regional and State offices maintain files for the facility to be inspected. Information may include:

- A summary of names, titles, locations, and phone numbers of responsible persons involved in the hazardous waste program

- A list of wastes that are treated, stored, and disposed and how each is managed (for TSDFs)

- A list of wastes generated, their origins, and accumulation areas (for generators)

- Biennial, annual, or other reports required by RCRA and submitted to the regulatory agencies; these include any required monitoring reports

- A detailed map or plot plan showing the facility layout and location(s) of waste management areas

- The facility RCRA Notification Form (Form 8700-12)

- The RCRA Part A Permit Application (for TSDFs)

- The RCRA Part B Permit Application (for TSDFs, if applicable)

- The RCRA permit (for TSDFs, if applicable)

- Notifications and/or certifications for land disposal restrictions (for generators)

Generators

Hazardous waste generators are regulated under 40 CFR Parts 262 and 268. These regulations contain requirements for:

- Obtaining an EPA Identification number
- Determining whether a waste is hazardous
- Managing wastes before shipment
- Accumulating and storing hazardous wastes
- Manifesting waste shipments
- Recordkeeping and Reporting

- Restricting wastes from land disposal (also regulated under Part 268)

The generator regulations vary, depending upon the volume of hazardous wastes generated. The investigator must determine which regulations apply. Additionally, the investigator should do the following:

- Verify that the generator has an EPA Identification Number which is used on all required documentation (e.g. reports, manifests, etc.)

- Confirm that the volume of hazardous wastes generated is consistent with reported volumes. Examine the processes generating the wastes to show that all generated hazardous wastes have been identified. Look for improper mixing or dilution.

- Ascertain how the generator determines/documents that a waste is hazardous. Check to see wastes are properly classified. Collect samples, if necessary.

- Determine whether pre-transport requirements are satisfied, including those for packaging, container condition, labeling and marking, and placarding.

- Determine the length of time that hazardous wastes are being stored or accumulated. Storage or accumulation for more than 90 days requires a permit. Generators storing for less than 90 days must comply with requirements outlined in 40 CFR 262.34.

- Verify RCRA reports and supporting documentation for accuracy, including inspection logs, biennial reports, exception reports, and manifests (with land disposal restriction notifications/certifications).

- Watch for accumulation areas which are in use but have not been identified by the generator. Note: Some authorized State regulations do not have provisions for "satellite storage" accumulation areas.

- Determine whether a generator has the required contingency plan and emergency procedures, whether the plan is complete, and if the generator follows the plan/procedures.

- Determine whether hazardous waste storage areas comply with applicable requirements.

Transporters

Hazardous waste transporters (e.g., by truck, ship, or rail) are regulated under 40 CFR Part 263, which contains requirements for:

- Obtaining an EPA identification number
- Manifesting hazardous waste shipments
- Recordkeeping and reporting
- Sending bulk shipments (by water, rail)

Storage regulations apply if accumulation times at transfer stations are exceeded. Transporters importing hazardous wastes, or mixing hazardous wastes of different Department of Transportation (DOT) shipping descriptions in the same container, are classified as generators and must comply with 40 CFR Parts 262 and 268. Investigators evaluating transporter compliance should do the following:

- Verify that the transporter has an EPA identification number which is used on all required documentation (e.g., manifests)

- Determine whether hazardous waste containers stored at a transfer facility meet DOT pre-transport requirements

- Determine how long containers have been stored at a transfer facility. Storage over 10 days makes the transporter subject to storage requirements.

- Verify whether the transporter is maintaining recordkeeping and reporting documents, including manifests, shipping papers (as required), and discharge reports. All required documents should be both present and complete.

Treatment, Storage, and Disposal Facilities

Permitted and interim status TSDFs are regulated under 40 CFR Parts 264 and 265, respectively. [Part 264 applies only if the facility has a RCRA permit (i.e., a permitted facility); Part 265 applies if the facility does not have a RCRA permit (i.e., an interim status facility)]. These requirements include three categories of regulations consisting of administrative requirements, general standards, and specific standards (see Table 4-1 on following page). The investigator should do the following items to determine compliance with Subparts A through E:

- Verify that the TSDF has an EPA identification number which is used on all required documentation.

- Determine what hazardous wastes are accepted at the facility, how they are verified and how they are managed.

- Compare wastes managed at the facility with those listed in the Hazardous Waste Activity Notification (Form 8700-12); the Parts A and B permit applications; and any revisions, and/or the permit.

- Verify that the TSDF has and is following a waste analysis plan kept at the facility; inspect the plan contents.

- Identify and inspect security measures and equipment.

- Review inspection logs to ensure they are present and complete. Note problems and corrective measures.

- Review training documentation to ascertain that required training has been given to employees.

- Inspect waste management areas to determine whether reactive, ignitable, and incompatible wastes are handled pursuant to requirements.

- Review preparedness and prevention practices and inspect related equipment.

- Review contingency plans; examine emergency equipment and documented arrangements with local authorities.

Table 4-1: Permitted vs. Interim Status RCRA Regulatory Requirements

	Permitted Facility Regulations 40 CFR Part 264	Interim Status Regulations 40 CFR Part 265
Administrative/ nontechnical requirements (Subparts A-E)	• Applicability • Facility standards - Applicability - EPA identification number - Required notices - General waste analysis - Security - General inspection requirements - Personnel training - General requirements for ignitable, reactive, or incompatible wastes - Location standards • Preparedness and prevention • Contingency plan and emergency procedures • Manifests and recordkeeping	• Applicability • Facility standards - Applicability - EPA identification number - Required notices - General waste analysis - Security - General inspection requirements - Personnel training - General requirements for ignitable, reactive, or incompatible wastes - Location standards • Preparedness and prevention • Contingency plan and emergency procedures • Manifests and recordkeeping
General Standards (Subparts F-H)	• Release from solid waste management units • Closure/post closure requirements	• Groundwater monitoring requirements • Closure/post-closure requirements
Specific standards (Subparts I-R) (Part 264, Subparts I-O, X, AA, and BB) (Part 265, Subparts I-R, AA, BB)	• Containers • Tanks • Surface impoundments • Waste piles • Land treatment • Landfills • Incinerators • Miscellaneous units • Air emission standards for process vents • Air emission standards for equipment leaks	• Containers • Tanks • Surface impoundments • Waste piles • Land treatment • Landfills • Incinerators • Thermal treatment • Chemical, physical, and biological treatment • Underground injection • Miscellaneous units • Air emission standards for process vents • Air emission standards for equipment leaks

- Examine the waste tracking system and associated record-keeping/reporting requirements. Required documentation includes manifests and biennial reports, and may include unmanifested waste reports, and spill/release reports. Relevant documents may include on-site waste tracking forms.

- Verify that the operating record is complete according to 40 CFR 264.73 or 265.73.

The investigator can determine compliance with standards in Subparts F through H by doing the following items:

- For permitted facilities, verify compliance with permit standards with respect to groundwater monitoring, releases from solid waste management units, closure/post-closure, and financial requirements (Part 264).

- For interim status facilities required to monitor groundwater, dete rmine what kind of monitoring program applies.

- Depending on the type of investigation, examine the following items to determine compliance:

  - Characterization of site hydrogeology
  - Sampling and analytical records
  - Statistical methods used to compare analytical data
  - Analytical methods
  - Compliance with reporting requirements and schedules
  - Sampling and analysis plan (for content, completeness, and if it is being followed)
  - Condition, maintenance, and operation of monitoring equipm ent, including wellheads, field instruments, and sampling materials
  - Construction/design of monitoring system
  - Assessment monitoring outline and/or plan
  - Corrective action plan (permitted facilities)

- For waste management units that undergo closure, review the closure plan (including amendments and modifications), plan approval, closure schedule, and facility and regulatory certifications. Examine response actions to any release of hazardous waste constituents from a closed or closing regulated unit.

- For waste management units in post closure care, inspect security measures, groundwater monitoring and reporting, and the maintenance and monitoring of waste containment systems.

- Verify that the owner/operator has demonstrated financial assurance regarding closure.

The technical standards in Part 264 (Subparts I through O and X) and Part 265 (Subparts I through R) govern specific hazardous waste management units used for storage, disposal, or treatment (e.g., tanks, landfills, incinerators). Standards for chemical, physical, and biological treatment at permitted facilities under Part 264 have been incorporated under Miscellaneous Units, Subpart X. * The investigator should do the following:

- Identify all hazardous waste management areas and the activity at each; compare the areas identified in the field with those listed in the permit or permit application, as appropriate. Investigate disparities between actual practice and the information submitted to regulatory agencies.

- Verify that the owner/operator is complying with applicable design, installation, and integrity standards; field-check the design, condition, and operation of waste management areas and equipment.

- Determine how incompatible wastes and ignitable or reactive wastes are managed.

- Verify that the owner/operator is conducting self-inspections where and when required; determine what the inspections include.

- Identify and inspect required containment facilities for condition and capacity; identify leak detection facilities.

- Determine whether hazardous waste releases have occurred and how the owner/operator responds to leaks and spills.

* *The regulations governing miscellaneous units are intended to address technologies that were difficult to fit into the framework of prior regulations. Miscellaneous units, defined in 40 CFR 260.10, include but are not limited to: open burning/detonation areas, thermal treatment units, deactivated missile silos, and geologic repositories.*

- Verify that the owner/oper ator is complying with additional waste analysis and trial test requirements, where applicable.

- Check the closure/post-closure procedures for specific waste management units (e.g., surface impoundments, waste piles, etc.) for regulatory compliance.

- For landfills, determine how the owner/operator manages bulk and contained liquids.

- Field-check security and access to waste management units.

- Determine what are the facility monitoring requirements (for air emissions, groundwater, leak detection, instrumentation, equipment, etc.) and inspect monitoring facilities and records.

When inspecting land treatment facilities, the investigator should also review the following items:

- Soil monitoring methods and analytical data

- Comparisons between soil monitoring data and background concentrations of constituents in untreated soils to detect migration of hazardous wastes

- Waste analyses done to determine toxicity, the concentrations of hazardous waste constituents, and, if food-chain crops are grown on the land, the concentrations of arsenic, cadmium, lead, and mercury. The concentrations must be such that hazardous waste constituents can be degraded, transformed, or immobilized by treatment.

- Run-on and run-off management systems

When evaluating compliance of interim status incinerator facilities, the investigator also should review and/or inspect the following items:

- Waste analyses done to enable the owner/operator to establish steady state operating conditions and to determine the pollutant which might be emitted

- General procedures for operating the incinerator during start-up and shut-down

- Operation of equipment monitoring combustion and emissions control, monitoring schedules, and data output

- The incinerator and associated equipment

For permitted incinerators, the investigator must evaluate the incinerator operation against specific permit requirements for waste analysis, performance standards, operating requirements, monitoring, and inspections. The investigator also should do the following:

- Verify that the incinerator burns only wastes specified in the permit

- Verify methods to control fugitive emissions

- Determine waste management practices for burn residue and ash

The investigator evaluating compliance of thermal treatment facilities in interim status also should review the following items:

- General operating requirements, to verify whether steady state operating conditions are achieved, as required

- Waste analysis records, to ensure that (a) the wastes a re suitable for thermal treatment, and (b) the required analyses in Part 265.375 have been performed

Thermal treatment facilities permitted under 40 CFR Part 264 Subpart X will have specific permit requirements.

The investigator evaluating compliance of chemical, physical, and biological treatment facilities in interim status also should do the following:

- Determine the general operating procedures.

- Review the waste analysis records and methods to determine if the procedures are sufficient to comply with 40 CFR 265.13.

- Review trial treatment test methods and records to determine if the selected treatment method is appropriate for the particular waste.

- Examine procedures for treating ignitable, reactive, and incompatible wastes for compliance with Subpart Q requirements.

Chemical, physical, and biological treatment facilities permitted under Subpart X will have specific permit requirements.

Owners/operators of TSDFs must also comply with air emission standards contained in Subparts AA and BB of 40 CFR Parts 264 and 265. These subparts establish standards for equipment containing or contacting hazardous wastes with organic concentrations of at least 10%. This equipment includes:

- Process vents
- Pumps in light liquid service
- Compressors
- Sampling connecting systems
- Open-ended valves or lines
- Valves in gas/vapor service or in light liquid service
- Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connections

Total organic emissions from process vents must be reduced below 1.4 kg/hr and 2.8 Mg./yr. The other equipment types above must be marked and monitored routinely to detect leaks. Repairs must be initiated within 15 days of discovering the leak.

The facility operating record should contain information documenting compliance with the air emission standards. A complete list of required information is in 40 CFR 264.1035, 264.1064, 265.1035, and 265.1064. Permitted facilities must submit semiannual reports to the Regional Administrator outlining which valves and compressors were not fixed during the preceding 6 months. The investigator can do the following things:

- Visually inspect the equipment for marking.

- Review documentation in the operating record and cross-check this information with that submitted to the Regional Administrator in semiannual reports.

Land Disposal Restrictions

Land disposal restrictions (LDR) in 40 CFR Part 268 are phased regulations prohibiting land disposal [*] of hazardous wastes unless the waste meets applicable treatment standards. [**] The treatment standards are expressed as (1) contaminant concentrations in the extract or total waste, or (2) specified technologies.

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[*] *Land disposal includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault or bunker intended for disposal purposes.*

[**] *Treatment standards are in 40 CFR 268.40 through 43.*

Notifications and certifications comprise the majority of required LDR documentation. Notifications tell the treatment or storage facility the appropriate treatment standards and any prohibition levels (California List wastes) that apply to the waste. Certifications are signed statements telling the treatment or storage facility that the waste already meets the applicable treatment standards and prohibition levels.

The regulations divide hazardous wastes into restricted waste groups and apply a compliance schedule of different effective dates for each group (40 CFR 268, Appendix VII).

Investigators evaluating hazardous waste generators for LDR compliance should do the following:

- Determine whether the generator produces restricted wastes; review how/if the generator determines a waste is restricted.

- Review documentation/data used to support the determination that a waste is restricted, based solely on knowledge.

- Learn how/if a generator determines the waste treatment standards and/or disposal technologies.

- Verify whether the generator satisfies documentation, recordkeeping, notification, certification, packaging, and manifesting requirements.

- Ascertain whether the generator is or might become a TSDF and subject to additional requirements.

- Determine who completes and signs LDR notifications and certifications and where these documents are kept.

- Review the waste analysis plan if the gene rator is treating a prohibited* waste in tanks or containers.

Investigators evaluating TSDFs should do the following:

- Ensure the TSDF is complying with generator recordkeeping requirements when residues generated from treating restricted wastes are manifested off-site.

- Verify whether the treatment standards have been achieved for particular wastes prior to disposal.

* *Prohibitions on land disposal are explained in 40 CFR 268, Subpart C.*

- Review documentation required for storage, t reatment, and land disposal; documentation may include waste analyses and results, waste analysis plans, and generator and treatment facility notifications and certifications.

Subtitle I - Underground Storage Tanks (USTs)

Evaluating Compliance

Three basic methods are used to determine compliance in most inspections: (1) Interviews of facility personnel, (2) visual/field observations, and (3) document review. Because the tanks are located underground, visual/field observations have limited application in determining compliance for USTs. The UST program relies heavily on the use of documents to track the status and condition of any particular tank.

Interviews with facility personnel are an important starting point when determining compliance with any environmental regulation. Questions regarding how the facility is handling its UST program will give the inspector insight into the types of violations that may be found. Topics to be covered in the interview include:

- Age, quantity, and type of product stored for each tank on-site
- How and when tanks have been closed
- Type of release detection used on each tank (if any): some facilities may have release detection on tanks where it is not required
- Type of corrosion protect ion and frequency of inspections
- Which tanks have pressurized piping associated with them

Visual/field observations are used to determine if any spills or overfills have occurred that have not been immediately cleaned up. The presence of product around the fill pipe indicates a spill or overfill. Proper release detection methods can also be verified with field observations. During the interviews, ask the facility if monthly inventory control along with annual tightness testing is used. If monthly inventory control is used, check the measuring stick for divisions of 1/8 inch. A field check of the entire facility can also be done to determine if any tanks may have gone unreported. Fillports and vent lines can indicate the existence of a UST.

Documents take up the largest portion of time during a UST inspection. Documents that should be reviewed include:

- Notifications for all UST systems

- Reports of releases including suspected releases, spills and overfills, and confirmed releases

- Initial site characterization and corrective action plans

- Notifications before permanent closure

- Corrosion expert's analysis if corrosion protection is not used

- Documentation of operation of corrosion protection equipment

- Recent compliance with release detection requirements, including daily inventory sheets with the monthly reconciliation

- Results of site investigation conducted at permanent closure.

Document retention rules also apply, so be sure to get all of the documents a facility may be required to keep. To determine if the implementing agency has been notified of all tanks, compare the notifications to general UST lists from the facility. Usually, the facility will keep a list of tanks separate from the notifications and tanks may appear on that list that do not appear on a notification form. Also, compare the notifications to tank lists required in other documents, like the Spill Prevention Control and Countermeasures Plan.

Pollution Prevention

EPA is developing an Agency-wide policy for pollution prevention. Present authorities were established in the 1984 Hazardous and Solid Waste Amendments to RCRA [Section 3002]. The October 1990 Pollution Prevention Act established pollution prevention as a national priority.

Evaluating Compliance

EPA has developed a policy regarding the role of inspectors in promoting waste minimization (OSWER directory number 9938.10). As stated in the policy, to evaluate compliance, the inspector should:

- Check hazardous waste manifests for a correctly worded and signed waste minimization certification.

- Determine whether this certification was manually signed by the generator or authorized representative.

- Confirm that a waste minimization program is in place by requesting to see a written waste minimization plan, or requesting that the plan be described orally, or requesting that evidence of a waste minimization program be demonstrated. The inspector can, and should visually check for evidence of a "program in place" on-site.

- Check the Biennial Report and/or Operating Record of generators and TSDs, as appropriate. These documents are to contain descriptions of waste minimization progress and a certification statement. If known omissions, falsifications, or misrepresentations on any report or certification are suspected, criminal penalties may apply and the case should be referred for criminal investigation.

- Check any waste minimization language inclu ded in the facility's permits, any enforcement order, and settlement agreements. Verify that any waste minimization requirements are being satisfied.

The policy also states that the inspector should promote waste minimization by:

- Being familiar with recommending, and distributing waste minimization literature.

- Referring the facility to the appropriate technical assistance program for more specific or technical information.

- Providing limited, basic advice to the facility of obvious ways they ca n minimize their waste. This advice should be issued in an informal manner with the caveat that it is not binding in any way and is not related to regulatory compliance.

The multimedia inspection team can also document cross-media transfers of waste streams, which can result in false claims of waste minimization. For example, a facility could treat a solvent wastewater stream in an air stripper that has no air pollution control devices. On paper, the amount of solvent discharged to a land disposal unit or sewer system could show a reduction, but the pollutants are going into the air, possibly without a permit. Another example would be a facility claiming a reduction in hazardous waste generated because the waste stream was delisted.

COMPREHENSIVE EMERGENCY RESPONSE, COMPENSATION, AND LIABILITY ACT

The Superfund law of 1980, Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) including the SARA amendments of 1986 authorizes EPA to clean up hazardous substances at closed and abandoned waste sites and to recover the cost of cleanup and associated damages from the responsible parties. EPA can also take enforcement action against responsible parties to compel them to clean up sites. Other provisions of CERCLA require releases of hazardous substances over a specified amount ("reportable quantities") to be reported.

CERCLA is mostly an "after-the-fact" cleanup program, and there are no routine compliance monitoring inspections as in other programs. Sites are visited and environmental and other data are gathered for evaluation and assessment purposes, as well as to identify potential responsible parties. This information may ultimately be used in enforcement actions to recover the costs of cleanup or to compel cleanup by responsible parties.

Although CERCLA is not oriented to routine inspections of active industrial facilities, inspectors should be alert to signs of potential abandoned dump sites, spills, potential release of hazardous wastes, or other Superfund-type situations while they are out in the field, such as

- Rusting drums and containers, evidence of spills, discolored vegetation, discolored water, foul-smelling lagoons

- Statements by facility personnel about how they handle wastes

- Records of spills or other releases of hazardous substances, or potential releases of hazardous substances

- Records of non-RCRA sites where hazardous substances have been stored, treated, or disposed

The investigator should determine, through records review, interviews, etc., whether all RCRA and CERCLA sites have been reported to the proper authorities. The investigator should also evaluate assessment and response programs at a facility, if this objective is within the scope of the audit.

Additionally, the facility should be evaluated concerning State and local requirements controlling past and current disposal of municipal waste, nonhazardous industrial waste, and construction debris. The information concerning such past disposal activities may lead to unreported RCRA and CERCLA sites.

The initial step in evaluating compliance with solid/hazardous waste requirements is to identify all present and past waste streams generated at the facility and determine which are regulated by Federal,* State,** or local regulations, licenses, and approvals. Preferably, this determination is initiated during background document review before the on-site facility audit and supplemented/modified using information obtained while on-site. All waste streams generated (even those that the generator claims are not regulated) must be evaluated for regulatory inclusion. This will allow the investigator to determine whether the generator has properly identified all regulated waste streams.

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* *Definitions, identification, and listing of Federally regulated waste are given in 40 CFR 260 and 261 and CERCLA §101.*

** *Nonhazardous solid waste is usually regulated by the State and these regulations must be obtained to evaluate applicable facility activity.*

Once regulated waste is identified, the investigator can track the material from generation to final on-site disposition (on-site treatment/disposal) or storage and transport for off-site disposal and determine compliance with applicable regulations. Throughout the investigation, the investigator must keep in mind that both past and present activities need to be evaluated for compliance with applicable regulations.

TOXIC SUBSTANCES CONTROL ACT

This section describes those specific aspects of toxic chemical control that are addressed by the Toxic Substances Control Act (TSCA) and its associated rules and regulations (40 CFR Parts 702 through 799).

Basic Program

The regulation of toxics under TSCA is subdivided into two components for Agency enforcement program management purposes.

1. "Chemical control" covers enforcement aspects related to specific chemicals regulated under Section 6 of TSCA, such as polychlorinated biphenyls (PCBs), chlorofluorocarbons (CFCs), and asbestos.

2. "Hazard evaluation" refers to the various recordkeeping, reporting, and marketing submittal requirements specified in Sections 5, 8, 12, and 13 of TSCA; although, some elements of what might be termed "chemical control" are also addressed in these sections. Sections 12 and 13 of TSCA, which pertain to chemical exports and imports, respectively, will not be covered in this manual due to their special nature and unique requirements.

Prior to discussing TSCA activities * at a facility, the investigator must present appropriate facility personnel with copies of the following two TSCA audit forms:

1. Notice of Inspection - Shows purpose, nature, and extent of TSCA audit

2. TSCA Inspection Confidentiality Notice - Explains a facility's rights to claim that some or all the information regarding toxic substance handling at the facility is to be considered as TSCA Confidential Business Information (CBI)

* *All personnel handling material claimed as Confidential Business Information under TSCA must be cleared for access to that material in accordance with Agency procedures. An annual update is required.*

Before leaving the site, the following two forms must be completed, as appropriate.

1. Receipt for Samples and Documents - Itemizes all documents, photos, and samples received by the investigator during the audit

2. Declaration of CBI * - Itemizes the information that the facility claims to be TSCA CBI

Evaluating Compliance

Chemical Control

Although the controlled substances most frequently encountered during multimedia investigations are polychlorinated biphenyls (PCBs), the investigator should determine if other regulated toxic substances are present at the facility. Currently these include metal working fluids (Part 747), fully halogenated chlorofluoroalkanes (40 CFR 762), and asbestos (40 CFR 763); additional toxic substances may be regulated in the future. Because the probability of finding PCBs and PCB items at a facility is greater than finding other TSCA-regulated substances, the following discussion is directed toward an evaluation of compliance with proper PCB and PCB item handling procedures. Should other TSCA-regulated substances be present, the investigator should consult the regulations for appropriate requirements.

Management of PCBs/PCB items is regulated under 40 CFR 761. In general, these regulations address recordkeeping, marking and labeling, inspections, storage, and disposal.

Facilities which store and/or dispose of PCBs and PCB items should have EPA-issued Letters of Approval which contain facility operating and recordkeeping requirements in addition to those specified in 40 CFR 761. The investigator must obtain a copy of these approvals and any subsequent notifications to evaluate facility compliance. The inspector should review Part 761.30 to identify uses of PCB transformers which are prohibited beginning October 1, 1990. but with effective dates extending to October 1, 1993. The inspector should also review the requirements found in Part 761.30 which allow the installation of PCB transformers for emergency use.

In general, the compliance evaluation includes obtaining and reviewing information from Federal, State, and local regulatory agency files; interviewing facility personnel regarding material handling activity; examining facility records and inspecting material handling units. Specific investigation tasks include:

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* *These forms are generally completed during the closing conference. During the opening conference, facility personnel should be made aware that the latter form is used to itemize TSCA CBI material.*

- Inspect all in-service electrical equipment, known or suspected of containing PCBs, for leaks or lack of proper marking. A similar inspection should also be made of any equipment that the facility is storing for reuse. Make certain that any remedial actions were quick and effective in the case of leaks, spill, etc.

- If the above equipment includes any PCB transformers make certain that all relevant prohibitions are being met, such as those involving enhanced electrical protection, as well as other requirements in the Use Authorization section of the PCB Rule. Likewise with large PCB capacitors. Make certain that any hydraulic or heat transfer systems suspected of containing PCB fluids have been properly tested.

- Determine whether the facility is involved with servicing PCB items or using/collecting/producing PCBs in any manner. If so, make certain that the appropriate requirements of the PCB Rule are being met.

- Determine whether the facility is involved with either the storage or disposal of PCBs/PCB items. Inspect all storage for disposal facilities for proper containment, leaking items, proper marking, dates/time limits, location, protection from elements, and other necessary requirements. If the facility disposes of PCBs, make certain that proper methods are being employed and that design and operation of disposal units is in accordance with regulatory requirements.

- Determine whether storage/disposal facilities are complying with the notification and manifesting requirements contained in Subpart K of the PCB Rule.

- Thoroughly review, for purposes of adequacy and regulatory compliance, all records and reports required by the PCB Rule including the following:

  - Annual documents
  - Inspection logs
  - PCB transformer registration letters
  - Manifests/certificates of destruction
  - Test data
  - Spill clean-up reports
  - EPA issued permits or Letters of Approval
  - SPCC plan, if one is necessary
  - Operating records
  - Notification of PCB activity

Hazard Evaluation

Establishing compliance with the various hazard evaluation aspects of TSCA is best accomplished through review and evaluation of the recordkeeping, reporting, and submittal data required by the various regulatory components of Sections 5 and 8. In general, Section 5 addresses new chemicals (i.e., those not on the TSCA Chemical Substances Inventory) and Section 8 provides for control of existing chemicals (i.e., those chemicals that are on the TSCA Chemical Substances Inventory).

Much of the information obtained and reviewed under these two sections of TSCA will be declared "TSCA Confidential Business Information" (CBI) by company officials and, thus, special security procedures must be followed during review and storage of the documents, as discussed elsewhere.

Information in 40 CFR Parts 703 through 723 should be consulted for an explanation of TSCA terms and definitions. The following list summarizes the different objectives for inspections of the key TSCA Sections 5 and 8 components.

1. Premanufacture Notification (PMN)

   a. Verify that all commercially manufactured or imported chemicals are either on the TSCA Chemical Substances Inventory, are covered by an exemption, or are not subject to TSCA.

b. Verify that commercial manufacture or im port of new chemicals did not begin prior to the end of 90-day review date, and not more than 30 days before the Notice of Commencement (NOC) date. If commercial manufacture or import has not begun, verify that no NOC has been submitted.

c. Verify the accuracy and documentation of the contents of the PMN itself.

2. Research and Development (R&D) Exemption

a. Verify that the recordkeeping and notification requirements are being met for all R&D chemicals.

b. Verify that "Prudent Laboratory Practic es" and hazardous data searches are adequately documented.

3. Test Marketing Exemption (TME)

a. Verify that the conditions spelled out in the TME application are being met, particularly with respect to dates of production, quantity manufactured or imported, number of customers and use(s).

b. Verify that the TME recordkeeping requirements are being met.

4. Low Volume Exemption (LVE) and Polymer Exemption (PE)

a. Verify that specific conditions of the exemption application are being met, and that all test data have been submitted.

b. For an LVE, verify that the 1,000-kg limit per 12-month period has not been exceeded. For a PE, assure that the chemical structure and monomer composition(s) are accurate.

c. Verify that recordkeeping requirements for both LVEs and PEs are being met.

5. 5(e)/5(f) Order, Rule, or Injunction

a. Verify that all conditions of the order, rule, or injunction are being followed, including use of protective equipment, glove testing, training, and recordkeeping.

b. If a testing trigger is specified, verify production volume and status of testing activity.

6. Significant New Use Rule (SNUR)

a. Verify that no commercial production has occurred prior to the 90-day review date.

b. Verify that SNUR notices have been submitted for all applicable manufactured, imported, or processed chemicals.

c. Verify technical accuracy of SNUR submittal and completeness of required recordkeeping.

7. Bona Fide Submittals

Determine the commercial production (or import) s tatus and R&D history of those bona fide chemicals not found on the confidential 8(b) inventory. Verify findings against applicable PMN, TME, or other exemption.

8. Section 8(a) Level A PAIR and CAIR Report

a. Determine if Preliminary Assessment Information Rule (PAIR) and Comprehensive Assessment Information Rule (CAIR) reports have been submitted for all 8(a) Level A listed chemicals manufactured or imported by the facility.

b. Verify the accuracy of submitted PAIR information, particularly the r eported figures for total production volume and worker exposure levels.

c. Verify the accuracy of submitted CAIR information and if the report meets the date specified in the regulation.

9. Section 8(b) Inventory Update Rule (IUR)

a. Verify the accuracy of the information submitted in response to the IUR.

b. Determine that required information was submitted by the prescribed deadline for all chemicals subject to IUR.

10. Section 8(c) Recordkeeping

a. Determine if the facility has a Section 8(c) file and that allegations of significant health and environmental harm on record are properly filed and recorded.

b. Determine that all applicable allegations have been recorded and filed.

c. Determine if the facility has a written Section 8(c) policy and if the policy includes outreach to the employees.

11. Section 8(d) Reporting

Determine if copies (or lists) of all unpublished health effects studies have been submitted by manufacturers, importers, and processors for any Section 8(d) listed chemical.

12. Section 8(e) Reporting

a. Verify that all Section 8(e) substantial risk reports to the Agency were accurate and submitted within the required time frames.

b. Verify that all substantial risk incidents and/or test results have been reported to EPA.

c. Determine that the company has an adequate written policy addressing Section 8(e), and that it relieves employees of individual liability.

FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

Basic Program

Pesticides are regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and regulations developed under delegated State programs. Under FIFRA, pesticide products must be registered by EPA before they are sold or distributed in commerce. EPA registers pesticides on the basis of data adequate to show that, when used according to label directions, they will not cause unreasonable adverse effects on human health or the environment.

To ensure that previously registered pesticides meet current scientific and regulatory standards, in 1972 Congress amended FIFRA to require the "reregistration" of all existing pesticides.

Evaluating Compliance

The following list is for use in conjunction with specific storage/use/disposal requirements found on pesticide labels. FIFRA requires a written notice of inspection and written receipt for samples and documents collected.

- Determine types and registration status of all pesticides produced, sold, stored, and used at the facility, particularly if any are restricted or experimental use pesticides.

- Determine use(s) of each pesticide.

- Determine certification status of facility/handlers.

  - Verify who certifies facility/pesticide handlers [EPA, State, Department of Defense (DOD)].

  - Determine if commercial or private application.

  - If restricted-use pesticides are used, check if pesticide applicators are auth orized to use these pesticides.

  - Check expiration dates on licenses/certificates.

- Review applicable records.

  - Check previous audit records and complaints.

  - Check application records.

  - Check restricted-use pesticides records (must be kept at least 2 years). Document suspected violations accordingly.

  - Check inventory records.

  - Check training records.

  - Check equipment repair records.

- Inspect storage, mixing/loading, and container disposal areas.

  - Check bulk storage areas for compliance with Federal/State rules.

  - Check location, ventilation, segregation, shelter, and housekeeping of pesticide storage/handling areas. Check security, fire protection, and warning signs, as may be required by State regulations.

- Check mixing equipment/procedures for reducing handlers' exposures to pesticides.

- Check for safety equipment/procedures/use.

- Check container cleanup and disposal procedures.

• Pesticide waste disposal

- Check to see that pesticides are dispo sed of in accordance with applicable label and RCRA requirements.

• Determine measures taken to ensure worker safety.

- Check pesticide use records for re-entry time limit notation.

- Check pesticide use records for record of informing farmer or warning workers and/or posting fields.

- Provide farmer and/or applicator copy of current worker protection standards.

• Observe actual pesticide application.

- Observe mixing/loading and check calculations for proper use dilution.

- Observe when spray is turned on/off with respect to ends of field.

- Watch for drift or pesticide mist dispersal pattern.

- Note direction of spraying pattern and trimming techniques.

- Record wind speed and direction, air temperature, and relative humidity.

- Observe application with respect to field workers, houses, cars, power lines, and other obstacles.

- Determine if applicator and assisting personnel are wearing safety gear required by the label.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

Basic Program

The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 is a free-standing law contained within the Superfund Amendments and Reauthorization Act (SARA) of 1986. EPCRA is also commonly known as SARA Title III. EPCRA requires dissemination of information to State and community groups and health professionals on chemicals handled at regulated facilities.

An EPCRA audit verifies that the facility owner/operator has notified State and local agencies of regulated activities; has submitted information to specific State and local agencies; and has prepared and submitted all other required reports.

Evaluating Compliance

Emergency Planning (Sections 301 through 303)

EPA promulgated regulations which identify extremely hazardous substances and the levels to be regulated under EPCRA. The inspector should determine whether the facility is subject to EPCRA regulation. If the facility does meet the requirements, the inspector should verify whether the facility owner/operator:

- Notified the State emergency response agency and the local emergency planning committee that the facility is regulated under EPCRA

- Designated a facility emergency coordinator to assist the local emergency planning committee in the planning process

- Notified the local emergency pl anning committee of the emergency coordinator's identity

Emergency Notification (Section 304)

The owner/operator of a facility subject to EPCRA must immediately report releases of hazardous substances. Substances subject to this requirement are the extremely hazardous substances listed in 40 CFR Part 355 and substances subject to the emergency notification requirements under CERCLA Section 103(a) or (c). The inspector should verify whether an immediate notification was made to the:

- State emergency response commission
- Local emergency planning committee
- National Response Center for spills involving CERCLA reportable quantities

Community Right-to-Know Requirements (Sections 311 through 312)

Manufacturing facilities subject to the Occupational Safety and Health Act (OSHA) Hazardous Communication Regulation (29 CFR Part 1910) are required to prepare Material Safety Data Sheets (MSDS) for each hazardous chemical handled at the facility. Manufacturing facilities covered are contained within Standard Industrial Classification (SIC) Codes 20 through 39. OSHA revised its Hazardous Communication Regulation, effective September 23, 1987, to require that MSDSs be prepared by nonmanufacturing facilities. The inspector should verify that the facility owner/operator has sent the following to the State emergency response commission, the local emergency planning committee and the local fire department:

- MSDS or a list of chemicals covered by MSDS found at the facility
- An annual inventory of hazardous chemicals found at the facility

Toxic Chemical Release Reporting (Section 313)

Covered facilities (40 CFR Part 372.22) that manufacture, import, process, or use certain chemicals must annually report releases to the environment. The inspector should determine whether the facility owner/operator is required to submit a report (Form R) by July 1 for the preceding calendar year(s). All the following conditions must apply at the facility in order to meet the reporting requirements:

- The facility has 10 or more full-time employees
- An operation(s) identified in SIC Codes 20 through 39 is present
- The amount of chemical(s) handled exceeds the applicable threshold quantity

LABORATORY AND DATA QUALITY AUDITS

The purpose of laboratory evaluations and data quality assessment is to determine if all analytical and monitoring requirements have been met and to characterize data usability. The two approaches used are: (1) performance and (2) systems audits. This section discusses the approach to laboratory auditing under the CWA, RCRA waste handling, and RCRA groundwater regulations.

Performance audits are independent checks made to evaluate the quality of data produced by the total measurement system. This type of audit assesses the results and usually does not examine the intermediate steps to achieve these results. One example is the performance evaluation check sample which is used to validate calibration accuracy but usually not the overall effectiveness of the methodology. Another example is an audit of a particular measurement device using a reference device with known operational characteristics.

A systems audit typically involves an inspection of the components comprising the total measurement system. The Agency has certain expectations of the process used to sample, analyze, and report results. The systems audit is designed to objectively examine each important part of that process to determine deviations from required or recommended practice. The systems audit assesses such items as equipment, personnel, physical aspects, analytical and quality control procedures, quality assurance procedures, and other laboratory or measurement procedures. From a regulatory perspective, this type of audit may find noncompliance with equipment or procedural requirements, or even fraud.

Typically, a systems audit combined with performance audits will be conducted in order to extract the maximum amount of information.

A detailed list of items should be requested from the company and contract laboratory. This list should include:

- Standard Operating Procedures (SOPs)
- Quality Assurance Plan
- Personnel resumes
- Instrument maintenance and calibration records
- Monitoring data to be looked at

If performance evaluation samples are to be analyzed, these should be forwarded to the company at the earliest possible time. If preliminary data is available, it should be carefully examined for problems and if problems are found, a more careful examination of these areas can be made on-site.

During the on-site visit, every component of sample handling, sample analysis, and data reduction should be examined. The auditor starts with the laboratory supervisor and QA officer to verify that the information supplied on personnel training, quality assurance/quality control, and SOPs is correct. For each parameter determined, the individual or individuals who actually make that determination are interviewed. The analyst is asked to detail exactly what happens to each sample and demonstrated the use of equipment including instrument calibration. Checklists are prepared as an aid to the inspector. Bench data (initially recorded numbers, strip charts, etc.) is selected. Final results are calculated from the bench data by the inspector and compared with the results reported to the agency. On-site personnel will be asked to explain any discrepancies at this time. Other documents necessary to the case or as potential evidence are copied.

The final assessment and data quality determination is normally performed following the on-site audit. Critical data are re-examined for trends and anomalies. Where necessary, data is computerized and analyzed using statistical software packages. Techniques such as mass balance, solubility product determination, oxidation-reduction state consistency are used, where applicable, to indicate data problems. A propagation of error treatment may be used to establish data quality. Performance audit results are evaluated against reference database statistics. Tasks for common laboratory audits are:

NPDES (Water)

- Determine that the exact date, time, and person who takes each sample are recorded.

- Determine that the exact date, time, person, and method used for each type of determination are recorded.

- Inspect permit carefully to ensure that the permittee adheres to specified conditions.

- Ensure that methods used are in conformance with 40 CFR 136 unless alternate approval has been obtained.

- Ensure that proper chain-of-custody, accurate flow measurements, field preservation techniques, and instrument calibration procedures are practical.

RCRA Waste Handling

- Determine which parts of the regulations are applicable to the site.

- Determine which waste analysis plans (WAPs) were in effect during the time of records and evaluation.

- Determine that the WAPs meet the specifications of the regulation.

- Determine that each type of analysis specified in the WAPs is performed in accordance with the methodology specified and under the circumstances required.

- Determine that the methodology specified is adequate.

RCRA Groundwater

- Determine that the sampling and analysis plan (SAP) is a dequate.

- Determine that the laboratory follows the methodology specified in the SAP.

- Determine that this methodology is adequate.

- Calculate detection limits to ensure that they are adequate for groundwater protection.

CHAPTER FIVE

POLLUTION CONTROL EQUIPMENT

PURPOSE

In this chapter information regarding various types of existing technology in air pollution control devices are presented, as well as the emerging technology in air pollution control equipment.

The EPA has released documents to aid in the inspection of pollution control equipment which include the following:

- *A Compendium of Air Pollution Control Equipment Checklists*, EPA 340/1-91-014, September 1991.

- *Baseline Source Inspection Techniques*, EPA Course 445

These sources can be of significant help in preparing and conducting an inspection.

Additionally, a manual which is of great assistance in identifying emission points and process descriptions is the *Air Pollution Engineering Manual*, Air and Waste Management Association (AWMA).

EXISTING AIR POLLUTION CONTROL EQUIPMENT TECHNOLOGY

Baghouse/Fabric Filter

Fabric filters remove particles by passing the contaminated gas stream through a woven or felted fabric, usually in a cylindrical configuration. Depending on the direction of gas flow, particles are deposited on either the inside or outside of the cylindrical "bag". Initially, such forces as impaction, diffusion and electrostatic attraction are primarily responsible for particle capture by the fabric fibers. However, as the dust coats the filter and increases in thickness, direct sieving begins to dominate.

As the thickness of the dust-cake increases, so does the pressure lost in moving the gases across the filter. To keep pressure loss reasonable, it is necessary to periodically clean the fabric. The three most popular cleaning methods are shaking, reversing air flow direction and pulsing with compressed air.

Shaker cleaning

In a shaker cleaning collector the dirty gas stream enters the hopper area and then moves across a tube-sheet to the inside of the filter tubes. The gas stream passes through the filter, depositing the particles on the inside. When it is time to clean the fabric, the collector is isolated from air flow and the bag shaken by moving the supports from which the bags are hung. The dust drops into the hopper where it is removed through a dust discharge valve.

Reverse-air cleaning

The reverse-air-cleaning collector is nearly identical in appearance to the shaker, except the bags are hung from rigid supports. Cleaning is accomplished by isolating the collector from the dirty gas flow and introducing clean gas flow in the reverse direction. This reverse flow dislodges the dust which falls into the hopper. At this point the cleaning air is quite dirty, so it is ducted to an operating unit for cleaning. Thus, a reverse-air collector requires a minimum of two units.

Pulse cleaning

Cylindrical bags are suspended from a tube-sheet located near the top of the collector, and the dirty gas flow is directed through the outside of the bags and up through the center to the clean gas discharge. Metal cages are placed inside the bags to prevent collapse. Cleaning is accomplished by directing a pulse of compressed air into the top of the bag and against the dirty gas flow. This pulse momentarily dislodges the dust from the outside of the bag and slowly works it down toward the hopper. Bags are usually cleaned one row at a time without isolating the collector from the dirty gas flow.

Level II Inspection

- Method 9 observation of the baghouse discharge.

- Method 9 observation of fugitive emissions from baghouse solids handling operation (if reentrainment is occurring).

- Method 9 observation of fugitive emission from process equipment.

- Counterflow checks of audible air infiltration into fan, baghouse (solids discharge valve, access doors, shell) and ductwork. Also check physical condition and location of hoods.

- Static pressure drop across baghouse using on-site gauge; compare with baseline data.

- Comparison of compressed air pressures at baghouse reservoir with baseline values.

- Check for audible leaks of compressed air at fittings.

- Check operation of diaphragm valves, record number of valves which do not appear to be working properly.

- Check inlet gas temperatures using on-site gauge.

- Observe and describe corrosion of baghouse shell and hoppers.

- Evaluate bag failure records, gas inlet temperature records, pressure drop data, and other maintenance information.

Performance evaluation

- Visible emissions greater than 10% from the baghouse indicate poor performance. Inspection should include evaluation of bag problems, including but not limited to abrasion, chemical attack, ember damage, high temperature damage, and improper cleaning. A rip test should be done on failed bags unless quantitative fabric tests have been performed. If conditions appear to be severe, a Level III inspection (primarily clean side checks) is warranted.

- Fugitive emissions from all process sources should be carefully documented. Reasons for poor capture should be investigated, including, but not limited to, air infiltration, poor hood condition or location, fan belt slippage (listen for squeal), fabric blinding and poor cleaning effectiveness. The static pressure drop data and cleaning system performance checks (compressed air pressures, conditions of diaphragm valves and frequency of cleaning) are very important.

- The counterflow check of the entire system for air infiltration is very important since this can generally lead to severe problems.

Safety considerations

- Since the inspector must enter the facility to make a Level II inspection, all normal safety precautions apply.

- The Level II inspection involves some climbing and close contact with the pulse jet baghouse. Check the integrity of all supports and ladders. Climb ladders properly. Avoid contact with hot ducts and roofs. Avoid downward pointing gas discharge points.

Cyclones

In a cyclone, the dirty gas stream is directed into a cylindrical shell, either through a tangential entry or through turning vanes. The result is a confined vortex in which centrifugal forces drive the entrained particles toward the outside wall. Particles successfully deposited slide down the wall and into the hopper, from which they are removed through a dust discharge valve.

Cyclones can be constructed in either single or multiple configurations. Single cyclones are generally characterized as either high efficiency or high throughput. High efficiency cyclones have a narrow inlet opening in order to attain high inlet velocity, a long body length relative to its diameter and a small outlet diameter/body diameter ratio. High throughput cyclones, which are inherently less efficient, have larger inlet openings, a shorter body length and larger gas exits.

Multi-cyclones have numerous small diameter, (6-9 inch) cyclone tubes in parallel inside a single housing. Each cyclone is mounted into a lower "tube-sheet" which separates the in-coming dirty gas stream from the hopper level below. The outlet tube from each cyclone extends up through the in-coming dirty gas stream and into an upper tube-sheet that separates the dirty gas from the cleaned gas.

Cyclone efficiency is very sensitive to particle size, with performance deteriorating rapidly for particles less than about 2-5 μm diameter. When particle size distribution and gas flow rate are relatively constant, changes in pressure drop across a cyclone provide a good indicator of changes in collection efficiency.

Level II inspections

- Method 9 observation of the stack for a sufficient period to fully characterize conditions during normal process cycles.

- Method 9 observation of any fugitive emissions from process equipment, material handling operations, and stockpiles.

- Air infiltration sites on collector shell, hopper, solids discharge valve, and inlet ductwork.

- Static pressure drop across collector as indicated by on-site gauge.

- Inlet gas temperature as indicated by on-site gauge.

<u>Performance evaluation</u>

- If the visible emissions have increased more than 5% opacity since the baseline period or if the visible emissions are within 5% of the regulatory limit, a subsequent Level II or Level III inspection is necessary.

- Fugitive emissions from the process area can be at least partially due to air infiltration into the ductwork or collector. The process area and ductwork should be checked in any subsequent Level II or III inspections.

- The static pressure provides an indication of the flow rate and the resistance of gas flow. The static pressure should be checked against baseline static pressure drops for similar process operating rates. If the present value is higher, then pluggage is possible. If the static pressure drop is now lower, erosion of outlet tubes and gasket problems are likely.

<u>Safety considerations</u>

- Position selected for the Method 9 observations should be secure from moving vehicles such as cars, trains, and moving machinery.

- There must be secure footing. Stockpiles are not acceptable.

- All climbing and walking safety procedures are very important. Some horizontal structures may not be able to withstand the load of accumulated solids and several people.

- Contact with hot surfaces must be avoided.

- Many multi-cyclone collectors are located in hot areas. Heat stress should be avoided by limiting the time spent in the area (moderate heat conditions) or by not entering the area (high heat areas).

- Poorly ventilated areas must be avoided.

Electrostatic Precipitator

Electrostatic precipitators (ESP) remove particles from a contaminated gas stream by employing the principle of attraction of opposite charges. The particles are given an electric charge by forcing them to pass through a corona, a region in which gaseous ions flow. The electric field that forces the charged particles to the walls comes from electrodes maintained at high voltage in the center of the flow. When the particles reach the collection plate they slowly lose their charge through conduction, ideally retaining just enough charge to hold the particles to the plate but not so much that it inhibits further deposition or makes removal difficult. Periodically, the plate is vibrated or rapped and the dust drops into the hopper.

The electric field is powered by direct currents supplied from transformer-rectifier (T-R) sets mounted on the roof. Each T-R set serves one or two fields or electrical sections. Efficiency of collection is usually highest when the voltage is highest. Most industrial ESPs operate with a negative corona because of its stability under high voltage conditions. Peak performance is indicated by the beginning of sparking from electrode to plate.

Once the particles are collected on the plates, they must be removed from the plates without reentraining them into the gas stream. This usually accomplished by knocking them loose from the plates, allowing the collected layer of particles to slide down into a hopper, from which they are evacuated. In some designs the rappers are located inside the housing and cannot be seen by the inspector. Also located on top of the housing will be vibrator units for keeping the discharge electrodes clean. Some precipitators remove the particles by intermittent or continuous washing with water.

The electrostatic precipitator looks very much like a fabric filter, i.e., a large box-shaped structure with hoppers beneath it. However, the ESP is distinguished by the rapping mechanisms and transformer-rectifier sets mounted on top of the housing and by inlet/outlet locations that are generally on the ends.

Level II inspections

- Method 9 observation of the stack discharge.

- Timing, duration and pattern of intermittent puffs.

- Characteristics of any detached, condensing or reactive plumes.

- Physical conditions of transmissometer transmitter and retroreflector.

- Transmissometer zero and span values, status of window lights.

- Transmissometer strip chart data

- Precipitator electrical set data, including plots of the secondary voltages, secondary currents, and spark rates for each chamber starting with the inlet field and proceeding to the outlet field.

- Process operating data.

- Transmissometer strip chart records and electrical set records.

Performance evaluation

- An increase of more than 5% opacity in the visible emission since the baseline period or visible emission within 5% opacity of the regulatory limit warrant a Level III inspection.

- If the data indicate the unit is operating in moderate or high resistivity conditions, the power input should be computed and compared against the baseline values.

- The secondary (or primary) voltages should be compared with the baseline values.

- The field-by-field electrical data plots should be compared with baseline plots.

The transmissometer strip charts should be analyzed for characteristic patterns of operating problems.

Safety considerations

- Inspectors should be trained in safety procedures prior to using stack elevators to reach transmissometers mounted on stacks.

- All ladders and platforms should be checked before use. Safe ladder-climbing practices are necessary.

- Poorly ventilated areas around expansion joints, flanges and other areas must be avoided.

Wet Electrostatic Precipitator

Wet electrostatic precipitators (WESP) operate much the same way as the dry ESP except that the WESP is operated with wet walls instead of dry. The advantage of the wet wall precipitator is that is has no problems with rapping reentrainment or with back corona. The disadvantage is the increased complexity of the wash and the fact that the collected slurry must be handled more carefully than the dry product, adding to the expense of disposal. WESPs come in several types: weighted wire, rigid frame, rigid electrode. The process gas is charged as it enters the WESP and water is sprayed into the gas precipitating contaminants which are pumped out with the water. The water is treated by filtration and flotation before being recycled. Control efficiencies ranged from 90-98% for PM, depending on the inlet loading and particle size distribution.

The WESP functions as a air pollution control device within the wood panel industry for process equipment such as wood flake dryers in the OSB production process and serves to capture PM air contaminants. Secondary voltage and current are two typical operating parameters for determining the operational status of the WESP. A typical reading of the operating parameters for 3 three fields are shown in Table 5-1.

Table 5-1: Example WESP Electrical Field Readings

FIELD	SECONDARY VOLTAGE (kV)	SECONDARY CURRENT (mA)
1	39	250-317
2	41	354
3	37	269-291

The best collection occurs when the highest electric field is present, which roughly corresponds to the highest voltage on the electrodes. The lowest acceptable voltage is the voltage required for the formation of a corona, the electrical discharge that produces ions for charging particles.

See DESPs for information regarding inspection points and safety considerations.

Wet Scrubber

Wet collectors remove contaminants from a gas stream by transferring them to some type of scrubbing liquid. For particles larger than about 1 µm, the dominant separation mechanism is impaction onto liquid droplets or wetted targets. For sub-micron particles and gases, the dominant mechanism is diffusion to liquid surfaces. Because of incompatible requirements, wet collectors are generally designed to perform as either a particle or a gas collector. Simultaneous collection of both particles and gases is usually possible only when the gas has a very high affinity for the scrubbing liquid.

Contacting the contaminated gas stream with the scrubbing liquid is only the first stage of a wet collector. Because the contact phase usually results in liquid entrained in the gas stream, the second stage is some type of liquid-gas separator. Common entrainment separators include chevron baffles, mesh pads and single-pass cyclones. Collectors producing large droplets may require only a little low-velocity head-space to allow the droplets time to settle back into the unit.

The almost endless variety of wet collectors makes it difficult to include all types and varieties in one discussion. To illustrate the range of designs and performance levels, four types of scrubbers will be briefly described: (1) a spray tower, (2) a tray scrubber, (3) a countercurrent packed tower and (4) a venturi scrubber.

Spray Tower

The dirty gas stream enters at the bottom of the scrubber and flows upward at velocities between 0.6 and 3.0 meters (2 and 10 feet) per second. The liquid enters at the top of the unit through one or more spray headers, so that all of the gas stream is exposed to the sprayed liquid. A spray tower has only limited particle removal capacity, and is generally selected for applications where the particles are larger than about 5 µm. Spray towers can be effective gas absorbers if the contaminant has a moderate affinity for the liquid.

Tray Scrubber

A tray scrubber can also be used for both particle and gas collection. The gas stream again enters at the bottom and passes upward through holes in the trays. The liquid enters at the top and cascades across one tray and then flows down to the next. An overflow weir is used to maintain a liquid level on each tray. Variations in tray design include the placing of assorted "targets" above each hole to enhance the scrubbing action. The tray scrubber is an effective collector of particles larger than about 1 µm and can be an effective gas absorber when the contaminant has a moderately low affinity for the liquid.

Packed Tower

Packed towers are used primarily for gas absorption because of the large surface area created as the liquid passes over the packing material. The beds can be either vertical or horizontal. The most efficient arrangement is the vertical countercurrent packed tower. The gas stream again enters at the bottom and passes upward through the packing. The liquid is sprayed from the top and flows downward in a thin film over the surface of the packing. The packed tower is an effective gas absorber when the contaminant has a low affinity for the liquid.

Venturi Scrubber

The dirty gas stream enters a converging section and is accelerated toward the throat by approximately a factor of ten. The liquid is injected into the scrubber just beyond the entrance to the throat, where the liquid is shattered into droplets by the high velocity gas stream. Particles are collected primarily by being impacted into the slower moving drops. Following the contactor is usually a single-pass cyclone for entrainment separation. The venturi scrubber is an effective collector of particles down to the sub-micron range, comparable in performance to the fabric filter or ESP, and can be an effective gas absorber when the contaminant has a moderately high affinity for the liquid.

Level II inspections

- Method 9 observation of the stack for a period of not less than 6 minutes. Average opacity should be calculated. Cycles in the average opacity should be described.

- Method 9 observation of all bypass stacks and vents. Method 9 observations of any fugitive emissions from process equipment.

- Presence of rainout close to the stack or mud lips at the discharge point.

- Presence of fan vibration.

- The liquor flow rate indicated by on-site gauge.

- Physical condition of shell and ductwork.

- Recirculation pond layout and pump intake position.

- Physical condition of nozzles observed through access hatch.

- Means used to dispose of purged liquor should be noted.

Performance evaluation

- A shift in the average opacity may be due to a decrease in the particle size distribution of the inlet gas stream. A concurrent inspection of the process operation is often advisable.

- Anything which affects the nozzles will reduce performance. The liquor turbidity is related to the vulnerability to nozzle pluggage and erosion.

- Shell and ductwork corrosion is often caused by operation at pH levels which are lower than desirable. The liquor pH should be measured using in-plant instruments if available.

- The performance of a spray tower scrubber is dependent on the liquor flow rate. Any problems which potentially reduce the flow rate should be fully examined.

Safety considerations

- All ladders and platforms should be check before use. Safe climbing and walking practices are important, especially in cold weather.

- Poorly ventilated areas should be avoided.

- Hot duct and pipes should not be touched.

- The inspection should be terminated if a severely vibrating fan is noted in the general vicinity of the scrubber.

- Under no circumstances should the inspector attempt to look inside an operating wet scrubber.

- Visible emissions observations should be made only in secure areas.

Afterburner/Direct Flame Incineration

Afterburners or direct flame incinerators raise fumes to incineration temperatures, thereby destroying thier offending content, and maintains tham at those temperatures for a given period of time as mandated by regulations-usually 0.5 seconds at 1400 °F. The afterburner is relatively inexpensive to buy and install. However, it is not designed for efficient use of fuel and, typically, consumes 2000% more fuel than other systems. It is typically suitable for low throughput applications, which require processing contaminated air at rates of 500 scfm or less.

Catalytic Incineration

Hydrocarbon-laden fumes are pushed by a fan through a preheat section, where the temperature of the fumes is raised to a maximum of 700 °F. The fumes then pass through another section of the system containing the catalyst, which is able to thermally oxidize the hydrocarbons at the reduced temperature of 700°F.

Catalytic incineration is move efficient than the afterburner, and is also a simple system. It works well on "clean" hydrocarbon fumes (low solvent concentration streams). It performs poorly with fumes contaminated with particulates, resin, heavy metals, or silicone-commonly found in oven or dryer processes. This poor performance is the result of the catalyst's cell structure becoming coated or poisoned with oxidized ash, which deteriorates its ability to oxidize the hydrocarbons at the preheat temperature and also may reduce flow through the system. Consequently, additional fuel must be burned to elevate the fumes to higher temperature in order to achieve oxidation.

Regenerative Thermal Oxidation Unit

The regenerative thermal oxidation (RTO) unit has in recent years been used in at least two wood paneling processes, MDF and OSB, for the control of organic PM, VOC and CO emissions from dryers and presses. RTOs operating at these types of facilities have resulted in VOC destruction efficiencies of up to 99.3% from dryers and up to 99.8% from presses. PM destruction efficiencies have been determined to be up to 90.4% from dryers and up to 87.4% from presses.* Carbon monoxide reduction efficiences are in the range of 60% to 80%.

The basic theory behind RTOs is based on five main points which include:

1) multiple packed beds with airflows (process gas and clean hot combustion gases) cycled/sequenced through the individual beds (by valving) are used to achieve the regeneration, or heat recovery. The packed beds are typically a ceramic material which act to transfer heat to the process gas.

2) a common combustion/retention chamber with burners connects all packed beds.

3) a purge system is used to provide high destruction efficiency for organic compounds (by evacuating contaminants from a chamber after its use as an inlet bed prior to its use as an outlet bed).

4) a fan (generally induced draft) provides for air movements through the RTO.

5) a programmable logic control center and other controlling instrumentation are usually used to manage RTO operation (e.g. valve sequencing and other functions). Operation is automatic and unattended.

RTOs which have been evaluated operate by heating the process gas to between 1200 and 1500 °F for a minimum of 1.0 seconds, destroying contaminants by incineration. Ceramic beds capture up to 95% of the heat energy released by the combustion of the supplied natural gas and contaminants. The process gas entering the combustion chamber is preheated by the energy in the ceramic beds.

RTO units have combustion chambers which alternately function as inlets for the process gas and outlets for the combusted exit gas. Such combustion chambers often must undergo a purge cycle in which high pressure air is used to clean out unburnt VOCs. RTOs are generally designed with an odd number of chamber so that the inlet/outlet functions of the parts are not disrupted by the purge cycle. In practice, the number of beds is usually more than two in order to handle higher airflows, as well as to provide for a purge mechanism to ensure high destruction and removal efficiency (DRE) of the contaminants. This design permits one chamber to be in the purge cycle, while one-half of the remaining chambers function as inlets to the combustion chamber and the other half functions as outlets (after its use as an inlet bed and before its use as an outlet bed). Additional regenerator beds can be added to the system to handle higher process exhaust flow rates. The unit's programmable logic control center switches chamber functions among the three phases at predetermined times to optimize heat recovery efficiency.

A common combustion/retention chamber connects all regenerator vessels. Each regenerator vessel is equipped with both inlet and outlet flow control valves which act to direct the air flow through the beds. A system fan (generally induced-draft) provides the driving force for air flow.

Particulate accumulation on the ceramic packed beds creates a pressure drop which can be resolved (reversed) by periodic purges or burnout. Therefore, the burnout (bakeout) process is an essential part of the proper opertion and maintenance of the RTO. In most circumstances the burnout can be scheduled with the plant shut down. The burnout process may take 6 to 8 hours. The extent of total particulate control will depend on PM inlet loading to the RTO, as well as the percentage of inorganic to organic composition of PM. Since the presence of inorganic PM results from the burning of wood fuel in the operation of the dryer burners, the higher the content of hardwood (such as Aspen) and the higher the dryer temperature, the higher the concentration of inorganic PM entering the RTO. As a result, the lower the inlet PM loading, the longer the expected bed life and the lower the inlet inorganic particulate component of PM loading, the longer the expected bed life. The bed life is affected because of the possible chemical attack on ceramic media (e.g. alkaline, Na, K, and Ca compounds) and possible fusion of inorganic salts to ceramic media in RTO hot zones (glazing). Certain salts (especially compounds of Na and K) have melting points close to typical RTO operating temperatures. So then the factors influencing the life of the ceramic packed beds include:

1) inlet particulate loading
2) inorganic particulate inlet loading and composition
3) type and composition of the ceramic (heat transfer media)
4) Wood type
5) Inlet dryer operating temperature

In general, the RTO is capable of removing the organic particulate by combustion but it is not capable of removing inorganic particulate. Due to the sub-micron size of inorganic particulate, it was initially anticipated that it would pass through the ceramic bed. Instead the inorganic sub-micron particulate tends to melt down and encompass itself in the bed in liquid form.

With respect to the control of PM from the RTO, two possible extreme scenarios exist.

1) the use of the highest efficiency particulate control device (such as WESP) to remove maximum particulate prior to the RTO.

2) the use of a "sacrificial bed/coating" in p lace of maximizing particulate removal prior to the RTO. This approach would require the replacement of the bed or coating periodically.

In order to ensure continuous compliance with VOC, NO_x, CO, PM requirements and proper maintenance of RTO, the following operating parameters are monitored *:

- RTO stack gas flowrate
- RTO combustion system operation
- RTO operating temperature
- RTO operational status (process or fresh air)
- Dryer burner fuel use rate
- Dryer burner fuel type (wood or gas)
- Dryer inlet temperature

- Dryer product throughput

For press RTOs the following are the parameters which should be monitored *:

- RTO stack gas flowrate
- RTO operating temperature
- RTO combustion system operation
- RTO operational status
- Press throughput

Figure 5-1 illustrates a typical regenerative thermal oxidation unit.

Figure 5-1: Regenerative Thermal Oxidation Flow Diagram

See Appendix C for RTO inspection checklist.

EMERGING CONTROL TECHNOLOGY

There are many proven methods capable of controlling the PM emissions associated with the wood panel industry, but there remains the difficulty of designing control devices which are capable of controlling both PM and VOC emissions. The following discussion concentrates on VOC control devices which are installed in series with PM control devices. The three types of VOC control technologies most applicable to the wood panel industry, at this time, Recuperative Thermal Oxidation, Regenerative Catalyst Oxidation, and biofiltration.

Recuperative Thermal Oxidation

This unit oxidizes the fumes in a combustion chamber but, unlike the common afterburner, makes use of the existing 1500°F gas by passing it through the low temperature inlet gas stream via an indirect shell-and-tube heat exchanger, thus preheating the incoming contaminated gas to within 65-80% of oxidation temperature.

Emissions from a flake dryer is limited by using a process where the heated air used to dry the flakes comes froman air-to-air heat exchanger where hot exhaust gas from the recuperative system heats ambient air. The ambient air is then used to dry the flakes. The dryer exhaust is fed back to either the "energy conservation section" of the Energy system (i.e. the blend chamber) or the "heat producing section" of the system (i.e. the fuel cells and upper combustion zone). The VOC and CO laden ambient air from the dryers is oxidized in the blend chamber and downstream ductwork at a minimum temperature of 1400 degrees F and a minimum residence time of approximately 1.0 seconds. This residence time is computed on the maximum design blend chamber flow rate of 20% of the dryer exhaust. The remaining 80% of the dryer exhaust is sued as combustion air for the system and the VOCs and CO are oxidized in the fuel cells and the upper combustion zone at 1600 degrees F and a residence time of greater than 2 seconds. The blend chamber control damper will modulate from 0 to 20% to maintain an average hot side temperature in the primary heat exchanger of 1400 degrees F in the most energy efficient manner. The system exhaust usually passes through a multicyclone (connected in parallel) and then a electrostatic precipitator in order to control particulate emissions. Figure 5-2 illustrates a typical recuperative thermal oxidation unit.

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Figure 5-2: Recuperative Thermal Oxidation Diagram

See Appendix C for Recuperative Thermal Oxidation Inspection Checklist.

Regenerative Catalytic Oxidization

A regenerative catalytic oxidizer (RCO) is a device constructed to raise the temperature of a VOC laden air stream to a temperature at which VOCs breakdown the presence of a catalyst and the compound elements will unit with the available oxygen in the gas to form H_20 and CO_2 which are released to the atmosphere.

The process involved in regenerative catalytic oxidation involves VOC laden air from industrial process exhaust sources being duct connected to the inlet flange of the RCO inlet manifold. The gas stream is drawn through the RCO assembly by negative pressure created by the induced draft fan. In operation, the gas is allowed to enter one or more regenerative chambers by means of air control valves located between the manifold and the RCO chambers. The gas then passes upward through a column of ceramic saddles. The ceramic material functions as a heat sink, and at the initial introduction of the gas, the heat sink is to from a preceding cycle.

As the process gas passes through the heat sink, the heat stored in the ceramic materials transferred by convection to the gas. As gas continues to pass through the heat sink the ceramic material is gradually cooled. At the same time the gas is heated. The gas leaves the heat sink and enters the catalyst at a substantially elevated temperature (which depends on the quantity of ceramic, the initial temperature of the ceramic, the gas velocity, and the geometry of the ceramic).

In the catalyst the VOCs present react at the elevated temperature to oxidize the CO_2 and H_2O. The combustion chamber is maintained at the elevated temperature through the use of an auxiliary fuel burner. The catalyst reaction temperature for most VOC constituents found in typical processes is between 600°F and 1000°F. Due to the fact that the process exhaust stream has been preheated and the VOCs have a fuel value, the actual auxiliary fuel requirements are minimized.

After the exhaust stream exits from the catalyst bed it passes vertically down through another column or columns of heat sink material, the outlet beds, which remain cool from the inlet cycle. The hot, clean stream will again preheat the ceramic material, or regenerate it.

The gas stream then leaves the regenerative chamber through an open valve on the outlet manifold, through the exhaust fan, and to the atmosphere. The clean gas discharged to the atmosphere is only moderately warmer than when it entered the oxidizer inlet manifold.

The catalyst volume required to oxidize the VOCs is dependent on the conversion efficiency required, typically 95%. The volume of catalyst is distributed evenly on top of the inlet bed or bed's heat recovery media and on top of the outlet bed's media.

An RCO unit is comprised of two, four, six, or more chambers, typically determined by reasonable shipping constraints, available space for the installation or equipment size. For a two chamber unit, which is the basic building block, one chamber is on an inlet cycle while the other is on an outlet cycle. The flow remains this way for approximately 30 seconds, when the chambers switch, inlet becoming outlet and outlet becoming inlet.

Generally, in order to alleviate the possibility of contaminated process exhaust gas being discharged to the atmosphere and potentially damaging pressure fluctuations, a transition valve and duct assembly is utilized which creates a means for the process exhaust to be maintained within the RCO unit. During operation of the transition system, the process exhaust will by-pass the inlet chamber to allow the valve to cycle. There is a loss of thermal efficiency during this portion of the cycle, but when the thermal efficiency of the total system is evaluated, this loss is insignificant.

For proper operation and maintenance of the system the following design parameters should be considered:

Design parameters which affect destruction efficiency

- Catalyst reaction temperature
- Space velocity through the catalyst
- Catalyst activity

Design parameters which affect catalytic efficiency (ability to recover heat after oxidation)

- Velocity of process air in the heat sink
- Mass of heat sink material
- Depth of heat sink
- Geometry of ceramic pieces

Figure 5-3 illustrates a typical RCO Unit.

Figure 5-3: RCO Flow Diagram

See Appendix C for RCO Inspection Checklist.

Biofiltration

Biofiltration is becoming more popular in the United States due to its low operating costs and low maintenance requirements. It can provide economic advantages over other air pollution control technologies if applied to off-gas streams that contain only low concentrations (typically less than 1000 ppm as methane) of air pollutants that are easily biodegradable.

Biofiltration harnesses the natural process of decomposition with immobilized microorganisms. A biofilter works by providing an environment in which microorganisms thrive. An organic material such as compost, peat or wood chips is surrounded by a thin water film, or biofilm. The microorganisms live in this aqueous environment.

When the industrial off-gas passes over the filter material, the pollutants contact and diffuse into the water phase where the bacteria are present. The pollutants are biodegraded by the microorganisms. The final products at the end of the degradation chain are H_2O and CO_2, which are emitted to the atmosphere.

The proper design and operation of a biofilter is extremely critical and requires consideration of a number of technical issues. Growth and metabolic activity of microorganisms in a filter depend primarily on the presence of dissolved oxygen in the biofilm, the absence of compounds that are toxic to microorganisms, the availability of nutrients, sufficient moisture, suitable ranges for temperature and pH, and residence time. Accordingly, the control of these parameters is essential for the efficient operation of a biofilter.

All dust and particulate matter should be removed before entering the biofilter. Particulate will block the flow distribution through the bed and cause a pressure drop across the filter.

It is necessary to preserve the water content of the filter by pre-humidifying the gas stream. This is accomplished with a low pressure drop packed tower or spray heads in a humidifying column. Biological activity inside the filter bed will generate heat and evaporate the water content of the bed. The water film must be preserved by process controls that keep the bed in a saturated condition. The filter media also is important. The organic material should provide the highest volume of water film possible while still creating an even flow distribution through the filter bed. Using the wrong filter media can cause nutrient, channelling or compaction problems. This can create anaerobic zones in the bed where the bacteria are not receiving oxygen or a food source, thereby decreasing the efficiency of the filter.

The bacteria most often used are mesophiles, which operate in a temperature range between 65 degrees F to 105 degrees F. Therefore, it is necessary to ensure the exhaust gas is delivered to the biofilter within this range.

Since most microorganisms prefer a specific pH range, changes in the pH of the filter material will strongly affect their activity. Depending on the type of microorganisms that are present, a drop in pH can destroy the resident population and reduce, if not eliminate, the filter's degradation capacity.

The routine and periodic maintenance of biofilters includes a number of operations. Continuous monitoring of the major operating parameters, such as off-gas temperature and humidity, and the filter's temperature and back pressure, may be required. Periodic sampling of the filter material to detect potential failures of the humidifier or changes in pH should also be conducted. Turning the filter material over, and replacing it after a certain period of time are the two major maintenance items needed.

A biofilter can fail for various reasons. For example, insufficient treatment will occur if the filter has been undersized (e.g. because of the inadequate knowledge of the raw gas characteristics). The presence in the off-gas of compounds that are toxic to the resident microorganisms (e.g. SO_2) can inactivate the filter material. Particulates in the raw gas can, depending on their load and chemical characteristics, result in sludge formation in the humidifier and clogging of the air distribution system. Insufficient humidification has often been the cause for system failures. This can result from, for example underdesigned humidifiers, inappropriate configuration of humidifier and blower and too high a temperature increase across the filer bed, resulting in net moisture loss to the off-gas. Rapid compaction of inappropriate filter material can, often in combination with inhomogeneous humidification, result in the formation of cracks and breakthroughs of untreated off-gas. Generation of acidic degradation end and by-products can result in a drop in pH and destruction of the microbial population. Figure 5-4 illustrates a typical biofiltration unit.

Figure 5-4: Biofiltration Diagram

See Appendix C for Biofiltration Inspection Checklist.

Pollution Prevention Approaches

Two technologies which are currently being utilized to mitigate air pollution within the wood panel industry can be classified as pollution prevention approach technologies. These technologies include the Closed Loop Gasification Drying System and the Recuperative System.

WOOD PANEL INDUSTRY INSPECTION GUIDANCE DOCUMENT

APPENDICES

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APPENDIX A

Wood Panel Industry
Pre-Inspection Checklist

(Review State/Regional files)

Name of Company: ____

Address: ____

Type of Facility: OSB/MDF/PW/PB

Responsible Person(s)/Title/Telephone: ____________________________

Date of Plant Start-up: ____

Previous Inspection:

Date: ____

Findings: ____

____

Production rate during inspection (MMSF): ________________________

Have all required reports been submitted? __________________________

Stack Test:

Date of most recent test: ____

Equipment tested: ____

Pollutant tested and method used: __________________________________

Operating rate of equipment tested: _________________________________

Results (obtain copy, if possible):

- Compliance status: ____
- State action taken: ____

  ____
- Facility action taken: ____

  ____

Visible Emission Observations (other than above):

Date:____

Average readings:____

What was source of emissions?: ____

Complaints:

Dates:____

Nature:____

Findings:____

Follow-up:____

Facility Malfunctions (Add additional sheet if necessary):

Date	Nature	Duration	Action taken	Date Reported

Facility Subject to PSD?

When did the facility submit application for PSD? ______________________________

What was the projected production rate (as stated in the permit application)?

____

What were the estimated t otal emissions from all sources at the facility?
(Dryer, Boiler, Press, Sawing and Trimming, etc.)

____

What basis was used for estimating the total emissions? (i.e. Emission Factors, Stack Testing, Mass Balances, etc.)

____

Modifications (i.e., adding new equipment, process changes, etc.) that resulted in increase in emissions?____

____

Facility's current potential to emit? ____

____

Subject to NSPS? If so which Subpart?

Is the facility located in an Attainment or Nonattainment area? ____________________

If Nonattainment area, for which pollutants? __________________________________

Permit Requirements: (list requirements such as, reporting, recordkeeping, notification, etc. or attach copy of permit which details requirements)

____

____

Date of most recent permit (attach a copy) ____

File Documents to have during the Inspection:

- Facility Plot Plan (i.e process flow diagram)
- List of permitted equipment

Toxic Release Inventory information:

Which chemicals are currently reported in the TRI for this facility? _________________

____

Is the quantity of each reported chemical consistent with the State permit applications and permit?____

____

Clean Water Act Requirements:

Does the facility have a National Pollutant Discharge Elimination System (NPDES) permit? If so, what is the date of the last permit? ___________________________

What are the self-monitoring requirements identified in the NPDES permit? __________

What does the permit require regarding proper facility an d maintenance?____________

Is the facility required to have a Best Management Practices (BMP) plan? ___________

Is the facility required to have a Spill Prevention Control and Countermeasure Plan?

____

Does the facility have any other requirements such as those identified in a Consent Decree? ___
____
____
____
____

APPENDIX B

Wood Panel Industry
Inspection Checklist

Date(s) of Inspection: ____

Time In: ______________________ Time Out: _______________________

Company Name: ____

Location of Facility: ____

Inspector(s): ____

Plant Contact Person(s): ____

Product type: OSB/MDF/PW/PB

Resin type(s) used and percent, if not 100% of one:
MDI_______; PF_________; UF_________: Other_______

% free formaldehyde (excess) in resin:

Type and percent of Wood:
Soft________; Hard_________;

Production Rate (MMSF):
3/8"________; 3/4"________;

- What was production over the last 6 months? Is today's production normal? If not, why not? ____

____

Modifications to production equipment since last inspection: ____________________________

____

____

Modifications to control devices since last inspection: ________________________________

____

Visible Emissions:(see Appendix B-1, Visible Emission Observation Form)

Source:____

Opacity:____

Equipment Operating Parameters:

Dryer:____
Number of dryers: __________
Type (Single-Pass or Triple-Pass) and Size (MMSF) _________
Preheater used? _______ To what temp? _________
Inlet Temperature: ________
Outlet Temperature: ________
Wood Feed Rate into the Dryer: ________
How heated?: ________
Type of Controls: ________
Residence Time: ________
Moisture of Flakes at Entrance: ________ at Exit: ________

If temperature charts are available, verify that the temperature of the dryers during the inspection normal with respect to previous months? If not, why not? ___________________________________

____

Boiler:
Type of boiler:____
Size:____
Fuel source:____
If steam generating, how much steam (lbs/hr, psi) is produced and for which sources?____

____

Heater:____

Press:

Operating Temperature: ______________

Heat source: ______________

Cycle Time (open press to close press): ______________

Moisture content of wood: ______________

Residence Time(time press closed): ______________

Pressure applied: ______________

Type of Control Equipment present:

Baghouse: check pressure drop; when was last time bag was replaced? why was it replaced? ____________

____

Cyclone____

____

Electrified Bed____

____

WESP____

____

Wet Scrubber____

____

Other (list)____

____

Sources(s) vented to Control Device:

Sawing and Trimming ______________

Dryer Exhaust ______________

Boiler Exhaust ______________

Press Exhaust ______________

Other ______________

Inspection of Control Equipment (see Appendix C-1 through C-5):

Wet Scrubber: ______________________________

Dry Electrostatic Precipitator: ______________________________

Wet Electrostatic Precipitator: ______________________________

Fabric Filter: ______________________________

Mechanical Collector (Cyclone and Multicyclone): ______________________________

Continuous Opacity Monitoring Systems (COMS):

Type: ______________________________
Opacity reading: ______________________________
% Downtime recorded in most recent reporting period: ______________________________
Excursions recorded: ______________________________

Particulate Fugitive Emissions (list sources such as road dust, shipping and receiving area, Plywood dryer leaks) ______________________________

____

List other fugitive emissions identified at the facility (emissions from presses are not considered fugitive emissions): ______________________________

____

____

Clean Water Act Requirements:

List any wastewater discharges directly to a receiving waterbody which are not listed in the facility NPDES permit ______________________________

____

List any NPDES permit limit exceedances found in discharge monitoring reports ______

____

Are all wastewaters generated by the facility adequately controlled, recycled, directed directed to the wastewater treatment plant (on or off-site), discharged through an outfall regulated by a NPDES permit? If not, identify those that are not. __________________

____

For off-site wastewater treatment, is the discharge required to meet pretreatment standards? ____________

For on-site wastewater treatment, does the wastewater treatment plant have the appropriate unit processes and is it properly sized to effectively treat the quality and quanity of wastewater generated by the facility? ____________________________________

____

Review field data from Self-monitoring system NPDES permit requirements.

Are there any discrepencies with field and laboratory data and measurement procedures as required by the NPDES permit. ____

____

List any operation and maintence problems (see NPDES permit requirements). _______

____

____

____

See Appendix E for Inspection report format

APPENDIX B-1

VE OBSERVATION FORM
Page 2

APPENDIX C-1

Air Pollution Control Checklists
WET SCRUBBER INSPECTION CHECKLIST

Company: ______________________ Inspection Date: _________________Location: ____________
___________ Inspector Name: ________________
Source ID: _____________________ Signature: ____________________
Inspection announced? (Y/N) ______ Last inspection date: _____________

General Information

Type of Process ____Source(s) Vented to Control Device ____________________________________
Control Equipment ID _______________ Installation date _________________

Wet Scrubber Equipment Type

Preformed Spray Scrubber: Spray Tower ________ Cyclonic Tower _______
Packed Bed Scrubber: Countercurrent __________ Cross-flow _________
Moving Bed Scrubber: _________________ Plate or Tray Tower Scrubber: ________
Gas-Atomized Scrubber: Venturi ____________ Orifice ____________ Rod______
Mechanically Aided Scrubber: _____________ Ionizing Wet Scrubber: ___________
Other (specify) ____Primary Control Function: Particulate _______ Gas Absorption ______ Both ________Instrumentation installed (specify type and if recording) ____ _________________________________Other APCD and/or auxiliary equipment (specify type and if upstream/downstream):____ __

Regulatory Requirements for Wet Scrubber

Air Permit No.: __________________ Issued by: ____________________
Date: _________________________ Expiration: ____________________
Permit Conditions (emission rate limits, opacity, etc.): ____ ____ _______________________

WET SCRUBBER INSPECTION CHECKLIST
Page 2

Company: ______________________ Inspection Date: _________________Equipment ID: _______ ___________

Federal/State/Other Requirements (specify): ____
____
____

Common Requirements for Level II Inspection

Opacity (attach appropriate EPA Method worksheet) ______________________________Condensing plume? (Y/N) _____________ Droplet reentrainment/rainout? (Y/N) _____Pollutant(s) controlled ___ ____Operating parameters: Pressure drop across scrubber (in. water) ____________________ (See appropriate equipment-specific section for other operating parameters.)
Liquor additives used (if applicable) ____Bypass provisions/events (specify) ______________________________________Apparent fan operation ___ __________ Pump operation _________________
Exterior conditions (specify location):
Shell/ductwork corrosion ____ Liquid leaks ___ ____
Other ____
Disposal methods purged liquor/solids ____________________________________Comments _______
____
____
____

Fan Data

Manufacturer ____________________ Model Number __________________Blade Type __________ ___________ Size (if applicable) _______________
Rated Horsepower _________________ AMPS at Rated Horsepower __________FD Fan ____ ____ ID Fan ________ RPM ________
Fan Inlet Air Temperature ________
Pressure Drop (in. water across fan) ________ Measured Fan AMPS _________
Fan curve or table available? (Y/N) ________

APPENDIX C-2

ELECTROSTATIC PRECIPITATOR INSPECTION CHECKLIST

Company: ______________________ Inspection Date: _________________Location: ____________
____________ Inspector Name: _________________
Source ID: ______________________ Signature: _____________________
Inspection announced? (Y/N) __________ Last inspection date: _____________

General Information

Type of Process ____Control Equipment ID _
_____________ Installation date _________________

ESP Equipment Type

Weighted Wire _________________ Rigid Electrode __________________Rigid Frame __________
__________ Other (specify) __________________
Instrumentation installed (specify type and if recording) ____________________________________
____Other APCD and/or auxiliary equipment
(specify type and if upstream/downstream): ____
____

Regulatory Requirements for ESP

Air Permit No.: __________________ Issued by: ______________________Date: ________________
__________ Expiration: ______________________Permit Conditions (emission rate limits, opacity, etc.): ____
____
____
_______________________ Federal/State/Other Requirements (specify): _________________________
____
____
____

ELECTROSTATIC PRECIPITATOR INSPECTION CHECKLIST
Page 2

Company: ______________________ Inspection Date: ______________Equipment ID: ___________________

Minimum Requirements for Level II Inspection

Visible Emissions (attach appropriate EPA Method worksheet) ____________________CEM Opacity (if applicable) ____
Number of: Fields _______ Chambers ________ T-R Sets _________Electrical Data:

Field	T-R Set No.	Primary voltage (volts)	Primary current (Amps)	Secondary voltage (Kilovolts)	Secondary current (Milliamps)	Spark rate (No./min)
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____

Operating Conditions:
Apparent rapper operation _______________________________________ Puffs/spikes present ____
Unusual process conditions ______________________________________
Exterior conditions: Corrosion _______Air inleakage _______Other _________

Dust Handling System: Fugitive emissions? (Y/N) ___________________________

Other inspection parameters required by permit or regulation (specify item and status): ______________

____

____

____

Comments ____

____

____

Company: ______________________ Inspection Date: _________________Equipment ID: _______ ___________

Detailed Inspection Parameters
(Evaluate all parameters for which data is available or as required by regulation)

ESP Specifications and Design Data

Manufacturer __________________ Model Number ______________________Number of: Fields _______ Chambers ________ T-R Sets ________
Plates: Height ________ Total Length ______ Total Area ________ Aspect Ratio ________________ (Total Length/Height)
Design Gas Flow (ACFM) __________Design Flue Gas Temperature __________Mass Emission Rate ______________
Specific Collection Area (SCA) _________ (Total Area/1000 acfm)
Inlet Opening Area ______________
Superficial Velocity ______________ Gas Treatment Time ______________
Power Density (Watts/ft^2) __________Currently Density (µAmps/ft^2) ____________Specific Corona Power (SCP) (Watts/1000 acfm) _________

Fan Data

Manufacturer ____________________ Model Number __________________Blade Type ___________________ Size (if applicable) ________________Rated Horsepower _________________AMPS at Rated Horsepower __________FD Fan __________ ID Fan __________ RPM __________
Fan Inlet Air Temperature _______________
Pressure Drop (in. water across fan) __________ Measured Fan AMPS __________Fan curve or table available? (Y/N) _________

ESP Operating Data

Inlet Gas Flow (ACFM) ___________
Flue Gas: Temperature __________ Moisture Content ___________
O_2 (%) _____________ CO_2 (%) ____________
Superficial Velocity ______________ Gas Treatment Time __________

Gas Conditioning Agent Used? (Y/N) ___ Type ______________________

Electrical Data Analysis:

Watts per Field ________ ________ ________
________ ________ ________
________ ________ ________
________ ________ ________

Total Watts ___________
Power Density (Watts/ft^2) __________ Current Density (µAmps/ft^2) _________________SCP (Watts/1000 acfm) ___________
Rapping Mechanism:

	Plates	Frames
Rapper/Vibrator Type:	___________	__________
Frequency:	___________	__________
Intensity:	___________	__________

ESP Physical Conditions

Exterior Corrosion ____
Evidence of Air Inleakage ____Condition of Inlet/Outlet Ductwork _______________________________________Condition of Insulators ____
T-R Sets Condition ____Rapper/Vibrator Operation ____

Dust Handling System

Does ESP have? (specify condition):

Hopper heaters (Y/N) _______________
Insulation (Y/N) _______________
Level indicators (Y/N) _______________
Vibrators (Y/N) _______________

Evidence of Pluggage ____Type of Dust Transport:

Screw __________ Bulk collection __________ Other _________________Fugitive dust present (Y/N)_____________
Fate of collected dust ____

APPENDIX C-3

WET ESP INSPECTION CHECKLIST

Company: ______________________ Inspection Date: _________________Location: ____________
____________ Inspector Name: ____________________Source ID: __________________________
Signature: ____________________
Inspection announced? (Y/N) _________ Last inspection date: _______

General Information

Type of Process ____Control Equipment ID _
____________ Installation date _________________

Wet ESP Equipment Type

Flat Plate ____________________ Concentric Plate _________________Vertical Pipe _________
_________ Other (specify) _________________
Instrumentation installed (specify type and if recording) _____________________________
____Other APCD and/or auxiliary equipment
(specify type and if upstream/downstream): ____
____

Regulatory Requirements for Wet ESP

Air Permit No.: __________________ Issued by: _____________________Date: ________________
_________ Expiration: _____________________Permit Conditions (emission rate limits, opacity, etc.): ____
____
____
______________________ Federal/State/Other Requirements (specify): _________________________
____
____
____

WET ESP INSPECTION CHECKLIST
Page 2

Company: ______________________ Inspection Date: _________________Equipment ID: ________ ___________

Minimum Requirements for Level II Inspection

Visible Emissions (attach appropriate EPA Method worksheet) ____________________CEM Opacity (if applicable) ____ESP Orientation: Vertical ________ ___ Horizontal __________
Inlet location _____________ Outlet location _____________
Number of: Fields _________ Chambers _________ T-R Sets ________
Electrical Data:

Field	T-R Set No.	Primary voltage (volts)	Primary current (Amps)	Secondary voltage (Kilovolts)	Secondary current (Milliamps)	Spark rate (No./min)
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____
____	____	_____	_____	_____	_____	____

Preconditioning sprays used? (Y/N) _____
Water spray rate ______________
Continuous wetting of ESP plates? (Y/N) _____
Washing rate ________Cycle _______
Liquor additives used ____Exterior conditions: Cor
Liquid leaks ______ Other ____________
Conditions of pumps, piping, valves ____Other inspection parameters required by permit or regulation (specify item and status): ___________________________
____
____
Comments ____
____
____

WET ESP INSPECTION CHECKLIST
Page 3

Company: ______________________ Inspection Date: _________________Equipment ID: ___________________

Detailed Inspection Parameters
(Evaluate all parameters for which data is available or as required by regulation)

ESP Specifications and Design Data

Manufacturer __________________ Model Number ______________________Construction Material: Casing ________ Plates ________ Electrodes ________Number of: Fields ________ Chambers __________ T-R Sets __________
Plates: Height ________ Total Length ________ Total Area ________
Design Gas Flow (ACFM) __________Design Gas Temperature _____________Mass Emission Rate _____________
Specific Collection Area (SCA) _________ (Total Area/1000 acfm)
Cross-sectional Area _____________
Superficial Velocity ______________ Gas Treatment Time ______________
Power Density (Watts/ft^2) __________ Current Density (µAmps/ft^2) ______________Specific Corona Power (SCP) (Watts/1000 acfm) _____________

Fan Data

Manufacturer ____________________ Model Number __________________Blade Type _____________________ Size (if applicable) ________________Rated Horsepower _________________AMPS at Rated Horsepower __________FD Fan ________ ID Fan ________
RPM ________Fan Inlet Air Temperature __________
Pressure Drop (in. water across fan) ________ Measured Fan AMPS _____________
Fan curve or table available? (Y/N) _____________

ESP Operating Data

Inlet Gas Flow (ACFM) ___________ Temperature ______________
Superficial Velocity ______________ Gas Treatment Time _________

Electrical Data Analysis:

Watts per Field ________ ________ ________
________ ________ ________
________ ________ ________
________ ________ ________

Total Watts ___________________
Power Density (Watts/ft^2) __________ Current Density (µAmps/ft^2) ________
SCP (Watts/1000 acfm) ___________
Liquor additive(s) used ________________ Injection rate ________________________Recirculated liquor pH ___________

ESP Physical Conditions

Exterior Corrosion ____Evidence of Air Inleakage ____Condition of Inlet/Outlet Ductwork ______________________________________Are insulator compartment heaters used? (Y/N) _____
Adequate ventilation? (Y/N) _____Condition of Insulators ____T-R Sets Condition ____Operation of pump(s) ____
Fate of purged liquor/solids ____
Comments ____

APPENDIX C-4

FABRIC FILTER INSPECTION CHECKLIST

Company: ______________________ Inspection Date: _________________Location: ____________
____________ Inspector Name: ____________________Source ID: __________________________
Signature: ____________________
Inspection announced? (Y/N) _______ Last inspection date: _____________

General Information

Type of Process ____Equipment (Baghouse) ID ______________ Installation date _________________

Fabric Filter Equipment Type

Pulse Jet ____________________ Reverse Air (outside-to-inside flow) __________Shaker _____
________________ Reverse Air (inside-to-outside flow) __________Other ____________________
____________________________________Instrumentation installed (specify type and if recording) _
____
_Other APCD and/or auxiliary equipment (specify type and if upstream/downstream): ______________
____

Regulatory Requirements for Fabric Filter

Air Permit No.: __________________ Issued by: ____________________
Date: _________________________ Expiration: ____________________
Permit Conditions (emission rate limits, opacity, etc.): _______________________________________
____
____
____ Federal/State/Other
Requirements (specify): ____
____
____
____

Company: ______________________ Inspection Date: _________________Equipment ID: _______
____

Minimum Requirements for Level II Inspection

Opacity (attach appropriate EPA Method worksheet or CEM printout) _______________
Pressure drop across baghouse (in. water) ____Inlet air temperature ______________________________
Bag cleaning mechanism and operating conditions:
- Cleaning interval _______________________
- Compressed air pressures (Pulse Jet Units) _______________________
- Cleaning spikes (puffing) present? (Y/N) ________________________
- Number of compartments offline _____________________________
- Number of compartments necessary for compliance _________________
- Number of bypass events (if applicable) ________________________

Exterior conditions (specify location):
- Corrosion ____
- Air inleakage ____
- Other ____

Dust Handling System: ____
- Fugitive emissions (Y/N) __________________

Other inspection parameters required by permit or regulation (specify item and status): _____________
____
____
____

Comments ____
____
____

FABRIC FILTER INSPECTION CHECKLIST
Page 3

Company: ______________________ Inspection Date: _________________Equipment ID: ___________________

Detailed Inspection Parameters

(Evaluate all parameters for which data is available or as required by regulation)

Fabric Filter Specifications

Manufacturer __________________ Model Number _________________
Number of Compartments __________ Bags per Compartment ____________
Total Number of Bags _____________ Bag Length ___________________
Bag Diameter _______ x 3.14 = Bag Circumference ____________
Number of Bags ____ x Length _____ x Circumference _____ = Total Cloth Area _____

Fabric Data

Manufacturer ____________________
Material _______________________ Woven or Felter ________________
Operating Temperature range _________ Bag replacement schedule _______________Chemical sensitivity: Acids ____ Alkalies ____ Oxidation _____ Solvents _____Physical sensitivity: Heat _____ Abrasion ____ Shaking ______ Flexing ____

Fan Data

Manufacturer __________________ Model Number _________________
Blade Type ___________________ Size (if applicable) _______________
Rated Horsepower _________________ AMPS at Rated Horsepower __________FD Fan _______ ID Fan _________ RPM __________
Fan Inlet Air Temperature __________ Pressure Drop (in. water across fan) _______Measured Fan AMPS __________ Fan curve or table available? (Y/N) _________

Automatic shutdown provisions (if applicable) ______________________________

Fabric Filter Operating Parameters

ACFM (estimated or calculated) __________ Total Cloth Area ________________
Air-to-Cloth Ratio ___________

Dust Characteristics

Dust type ____________________ Toxicity/hazardous material status _________Moisture content _______________

Abrasiveness/other properties ____Particle size data ___ ____________

Dust Handling System

Does baghouse have? (specify condition):

Hopper heaters (Y/N) ______________
Insulation (Y/N) _________________
Level indicators (Y/N) _____________
Vibrators (Y/N) __________________

Type of Dust Transport:

Screw ________ Bulk collection ________ Other ____________

Fugitive dust present (Y/N) ________________
Fate of collected dust ____

Interior Inspection of Fabric Filter Compartment (Optional)
(Do not attempt unless all applicable safety requirements are met)

At a minimum: 1) Use protective clothing and/or respirator appropriate to dust/gas stream hazard. 2) Ensure compartment is isolated, purged, and cooled. Door to be opened by plant personnel. 3) Check internal conditions from outside compartment door. Do not enter compartment. Check for:

Excessive clean side deposits of dust _____________________________________Bag tension ___________________ Fallen bags ____________________
General bag integrity (holes, tears, or abrasion) ______________________________ Corrosion present ____Air infiltration _______________________ ____________________________Comments ____
____

APPENDIX C-5

MECHANICAL COLLECTOR INSPECTION CHECKLIST

Company: ______________________ Inspection Date: _________________Location: ____________
___________ Inspector Name: _________________Source ID: _____________________
Signature: ____________________
Inspection announced? (Y/N) _______ Last inspection date: ______________

General Information

Type of Process ____Control Equipment ID _
___________ Installation date _________________

Mechanical Collector Type

Cyclone _____________________ Multicyclone __________________
Cyclone Bank _________________ Other (specify) _________________
Instrumentation installed (specify type and if recording) _____________________________________
____Other APCD and/or auxiliary equipment
(specify type and if upstream/downstream): ____
____

Regulatory Requirements

Air Permit No.: __________________ Issued by: ___________________
Date: ________________________ Expiration: ___________________
Permit Conditions (emission rate limits, etc.): ____
____
____
____ Federal/State/Other
Requirements (specify): ____
____
____
____

MECHANICAL COLLECTOR INSPECTION CHECKLIST
Page 2

Company: ______________________ Inspection Date: _________________Equipment ID: ___________________

Minimum Requirements for Level II Inspection

Opacity (attach appropriate EPA Method worksheet or CEM printout) _______________
Pressure drop across baghouse (in. water) ____Inlet air temperature __________
Physical Conditions:
Corrosion __________Abrasion near or opposite inlet(s) _______________
Air Inleakage ________ Pluggage (inlet or discharge) __________________
Other _____________

Dust Handling System:
Fugitive emissions (Y/N) __________ Hopper Heaters (Y/N) ______________
Vibrators (Y/N) _________________ Hopper Insulation (Y/N) ____________
Level Indicators (Y/N) ___________
Dust Isolation Device (Y/N) ________ Type _______
Type of Dust Transport:
Screw _______ Bulk Collection _________ Other __________
Fate of Collected Dust ____
Other inspection parameters required by permit or regulation (specify item and status): ____

Comments ____

Dust Characteristics

Dust type ___________________ Toxicity/hazardous material states _______________Moisture content _______________ Abrasiveness/other properties _______________Particle size data ______________

MECHANICAL COLLECTOR INSPECTION CHECKLIST
Page 3

Company: ______________________ Inspection Date:______________Equipment ID: ___________ ________

Detailed Inspection Parameters
(Evaluate all parameters for which data is available or as required by regulation)

Manufacturer __________________ Model No. ____________________
Construction type (welded or riveted) ______ Construction material _____________
Lining type ______ Internal "vortex breaker" _____________
Cyclone body diameter ________ ft Cyclone body length ________ ft
Cone length _________ ft Inlet dimensions _________ ft diameter (circular)
Inlet dimensions ________ ft x _____ ft (rectangular)
Inlet area _____ ft^2 Outlet diameter ______ ft
Design gas volume _____ acfm Design grain loading _________
Design entrance velocity _________ ft/sec Number of tubes (multicyclones) _______

Fan Data

Manufacturer ____________________ Model Number __________________Blade Type ___________ ___________ Size (if applicable) _______________
Rated Horsepower _______________ AMPS at Rated Horsepower __________FD Fan _______ ID F
Fan Inlet Air Temperature _________
Pressure Drop (in. Water Across Fan) _______Measured Fan Motor AMPS ___________Fan Curve or Table Available? (Y/N) ___________
Automatic shutdown provisions (if applicable) ______________________________

Operating Parameters

Inlet gas temperature ___________ ACFM (estimated or calculated) ___________
Pressure drop ________ (in. water) Actual gas entrance velocity _____________

Comments ____
____
____
____

APPENDIX C-6

REGENERATIVE THERMAL OXIDIZER INSPECTION CHECKLIST

Company: ______________________________ Inspection Date: _____________
Location: ______________________________ Inspector Name: _____________
Source ID:Signature: ____
Inspection announced? (Y/N) ________ Last inspection Date : ___________________

General Information

Type of Process ____
Source(s) Vented to Control Device _____________________________________
Control Equipment ID __________ Installation Date ______________________

RTO Equipment Type

Number of combustion/retention chambers _________________________________
Number of burners in each combustion chamber _____________________________
Type of heat transfer media in packed bed _________________________________
Composition of the heat transfer media ___________________________________
Other air pollution control device upstream or downstream ______________________
Primary control function: particulate___________ VOC_____________
Air Flow Rate ____
Burnout Frequency ____

Regulatory Requirements for RTO

Air Permit No.:_____________ Issued by:______________________
Date:_______________________ Expiration:____________________
Permit Conditions (emission rate limits, opacity, etc.): ____
____
____
____

Company:____________________ Inspection Date:_________________
Equipment ID: ____

Federal/State/Other Requirements (specify): ____
____
____

Common Requirements for Level II inspection

RTO operational status (process or fresh air) ________________________________
Opacity (attach appropriate EPA Method worksheet) ___________________________
after preliminary control device ___________________________________
in RTO stack____
Pollutant(s) controlled____
Air pollution device controlling (dryer or press) _____________________________
Operative parameters: Pressure drop across bed (in. water) ______________________
Pressure drop across system (in water) _______________________
RTO combustion chamber operating temperature _____________________________
Dryer inlet temperature____
Dryer product throughput (lbs/hr) ______________________________________
Dryer burner fuel use rate ____
Dryer burner fuel type (wood or gas) ____________________________________
RTO stack gas flowrate ____
Press throughput____
Apparent fan operation ____
Observation of ceramic media ____
Frequency of burnout ____
Burnout Temperature ____
Exterior conditions (specify location)
shell/ductwork corrosion _______________________________________
liquid leaks____
gas piping leaks____
gauges, flow and pressure switches, controls, etc. are functioning properly _________________
____
Other ____
Comments ____
____

REGENERATIVE THERMAL OXIDIZER CHECKLIST

Fan Data

Manufacturer________________ Model Number______________________
Blade Type__________________ Size (if applicable)____________________
Rate Horsepower_____________ AMPS at Rate Horsepower _______________
FD Fan_________ ID Fan _________ RPM________________________
Fan Inlet Air Temperature _____________
Pressure Drop (in. water across fan) ______Measured Fan Amps _________________
Fan curve or table available? (Y/N) ____________
Exterior conditions (specify location)
any excessive vibration? _______________________________________

APPENDIX C-7

REGENERATIVE CATALYTIC OXIDIZER INSPECTION CHECKLIST

Company:________________ Inspection Date:__________________________
Location:________________ Inspector Name:__________________________
Source ID: Signature:______________________________
Inspection announced? (Y/N) ________ Last inspection Date: ____________________

General Information

Type of Process ____
Source(s) Vented to Control Device ____________________________________
Control Equipment ID __________ Installation Date ______________________

RCO Equipment Type

Number of combustion/retention chambers ________________________________

Number of burners in each chamber ____________________________________

Type of catalyst/size/temperature of bed _________________________________

Composition of the heat transfer media __________________________________

Geometry of the heat transfer media ____________________________________

Other air pollution control device upstream or downstream ______________________

Primary control function: particulate___________ VOC_____________

Regulatory Requirements for RCO

Air Permit No.:_____________ Issued by:_____________________
Date:_______________________ Expiration:____________________

REGENERATIVE CATALYTIC OXIDIZER CHECKLIST
Page 2

Permit Conditions (emission rate limits, opacity, etc.): ____
____
____
____

Company:____________________ Inspection Date:_______________
Equipment ID:_______________

Federal/State/Other Requirements (specify): ____
____
____

Common Requirements for Level II inspection

RCO operational status (process or fresh air) _______________________________
Opacity (attach appropriate EPA Method worksheet) _________________________
after preliminary control device __________________________________
in RCO stack ____
Pollutant(s) controlled ____
Air pollution device controlling (dryer or press) ____________________________
Operative parameters: Pressure drop across ceramic/catalyst bed (in. water) ___________
Catalyst reaction temperature ____ Velocity of process air ____
Dryer inlet temperature ____
Dryer product throughput ____
Dryer burner fuel use rate ____
Dryer burner fuel type (wood or gas) __________________________________
RCO stack gas flowrate ____
RCO combustion system operation ____________________________________
Press throughput ____
Apparent fan operation ____

REGENERATIVE CATYLITIC OXIDIZER CHECKLIST
PAGE 3

Exterior conditions (specify location)
shell/ductwork corrosion ____
liquid leaks ____
gas piping leaks ____
gauges, flow and pressure switches, controls, etc. are functioning properly _________________
____
Other _______________
____
Comments ____
____
____

Fan Data

Manufacturer _________________ Model Number _______________________ Blade Type _____
______________ Size (if applicable) ____________________
Rate Horsepower_________________ AMPS at Rate Horsepower _____________
FD Fan ________ID Fan ________ RPM _____________________________
Fan Inlet Air Temperature ___________
Pressure Drop (in. water across fan) _____ Measured Fan Amps ________________
Fan curve or table available? (Y/N)
Exterior conditions (specify location)
any excessive vibration? ____

APPENDIX C-8

BIOFILTER INSPECTION CHECKLIST

Company:________________________ Inspection Date:_________________
Location:________________________ Inspector Name:_________________
Source ID:_______________________ Signature:_____________________
Inspection announced? (Y/N) ______ Last inspection Date: ___________________

General Information

Type of Process ____
Source(s) Vented to Control Device ______________________________________
Control Equipment ID __________ Installation Date ______________________

Biofilter Equipment Type

Type of construction and installation of biofilter ______________________________
____
(e.g., open single-bed, enclosed multiple bed, roof top installation, etc.)

Type of filter material ____

Process gas load rate ____

Other air pollution control device upstream or downstream ____________________________________
____

Primary control function: particulate ___________ VOC ___________

Regulatory Requirements for Biofilter

Air Permit No.:__________________ Issued by:_____________________
Date:_________________________ Expiration:_____________________

BIOFILTER CHECKLIST
Page 2

Permit Conditions (emission rate limits, etc.): ____
____
____
____

Company:____________________ Inspection Date:_______________
Equipment ID:_______________

Federal/State/Other Requirements (specify): ____
____
____

Common Requirements for Level II inspection

Raw gas conditioning? ____
Temperature of input gas ______________________________________
Inlet air pollutant concentration ___________________________________
Concentration of air pollutants in off-gas ____________________________
Rate of biodegradation per volume of filter ___________________________
Off-gas temperature ____
Off-gas humidity ____
Pollutant(s) controlled ____
Air pollution device controlling (dryer or press) _______________________
Operative parameters: Pressure drop across bed (in. water) ________________
Filter bed temperature ____
Filter bed moisture content _____________________________________
pH of filter material ____
Power consumption rate for biofilter _______________________________
Dryer product throughput ______________________________________
Dryer burner fuel use rate ______________________________________
Dryer burner fuel type (wood or gas) _______________________________
Press throughput ____
Residence time ____

Apparent fan operation ____

BIOFILTER CHECKLIST
Page 3

Exterior conditions (specify location) __________________________________
shell/ductwork corrosion _____________________________________
liquid leaks ____
gas piping leaks ____
gauges, flow and pressure switches, controls, etc. are functioning properly ________________
____
Other ____
Comments ____
____
____

Fan Data

Manufacturer ________________ Model Number ______________________ Blade Type _____
_____________ Size (if applicable) ___________________
Rate Horsepower_________________ AMPS at Rate Horsepower _____________
FD Fan ________ID Fan ________ RPM ____________________________
Fan Inlet Air Temperature ___________
Pressure Drop (in. water across fan) _____ Measured Fan Amps ________________
Fan curve or table available? (Y/N) ______
Exterior conditions (specify location)
any excessive vibration? _______________________________________

APPENDIX C-9
RECUPERATIVE OXIDATION INSPECTION CHECKLIST

Company:__________________ Inspection Date:______________________
Location:__________________ Inspector Name:______________________
Source ID:___________________ Signature:__________________________
Inspection announced? (Y/N) _________ Last inspection Date: _______________

General Information

Type of Process____
Source(s) Vented to Control Device _____________________________________
Control Equipment ID ______________ Installation Date_________________

Recuperative System Equipment Type

Number of combustion/retention chambers _________________________________
Number of burners in each chamber _____________________________________
Type of heat transfer media in packed bed _________________________________
Composition of the heat transfer media ___________________________________
Geometry of the heat transfer media _____________________________________
Other air pollution control device upstream or downstream ______________________
Primary control function: particulate___________ VOC_____________

Regulatory Requirements for the Recuperative System

Air Permit No.:______________ Issued by:_____________________
Date:______________________ Expiration:_____________________

Permit Conditions (emission rate limits, opacity, etc.): ____
____
____
____

RECUPERATIVE OXIDATION SYSTEM CHECKLIST
Page 2

Company:____________________ Inspection Date:_________________
Equipment ID:____

Federal/State/Other Requirements (specify): ____
____
____

Common Requirements for Level II inspection

Recuperative System operational status (process or fresh air) _____________________
Opacity (attach appropriate EPA Method worksheet) ___________________________
after preliminary control device ____________________________________
in Recuperative System stack ______________________________________
Pollutant(s) controlled ____
Air pollution device controlling (dryer or press) _________________________
Recuperative System operating temperature ____________________________
Velocity of process air ____
Dryer inlet temperature ____
Dryer product throughput ____
Dryer burner fuel use rate ____
Dryer burner fuel type (wood or gas) _______________________________
Recuperative System stack gas flowrate ______________________________
Recuperative System combustion system operation _______________________
Press throughput ____
Apparent fan operation ____
Exterior conditions (specify location)
shell/ductwork corrosion ____________________________________
liquid leaks ____
gas piping leaks ____
gauges, flow and pressure switches, controls, etc. are functioning properly __________
____
Other____
Comments____
____
____

Fan Data

Manufacturer ________________ Model Number ______________________ Blade Type _____
_____________ Size (if applicable) ___________________
Rate Horsepower_________________ AMPS at Rate Horsepower _____________
FD Fan ________ID Fan ________ RPM ____________________________
Fan Inlet Air Temperature ___________
Pressure Drop (in. water across fan) _____ Measured Fan Amps ________________
Fan curve or table available? (Y/N) ______
Exterior conditions (specify location)
any excessive vibration? _______________________________________

APPENDIX D

Process Operating Parameters

Equipment	Process			
	OSB	**MDF**	**PW**	**PB**
Dryer				
Temperature (°F)	850-1500	400-540	300-500	380-950
Capacity (tph)	12-13	5-8	2-10	9-27
Press				
Temperature (°F)	205-382	320-500	240-350	200-250
Cycle Time (minutes)	3.5-5	3.0	2-7	3.25-4.75
Pressure (psi)	825-4215	2000	1200	2500
# of Openings	14-40	1-10	20-40	20

APPENDIX E

WOOD PANEL EQUIPMENT/FACILITY EMISSIONS

Facility	Type	Equipment (Number of units)	PM/PM10 Emissions Per Unit	NOx Emissions Per Unit	CO Emissions Per Unit	VOC Emissions Per Unit	Basis
			Actual (tpy)	Actual (tpy)	Actual (tpy)	Actual (tpy)	Emission Factor (EF) or Stack Test (ST)
1	PW	Boiler (3)	135.3	23.7	215.0	2.8	PM-S.T./CO, NOx, VOC-E.F.
		Veneer Dryer (3)	3.9	--	--	157.8	ST
		Press (4)	--	--	--	.29	EF
2	PW	Boiler (1)	4.8	15.2	22.8	15.5	ST
		Veneer Dryer (2)	.13	--	--	5.4	ST
		Press (2)	--	--	--	.003	EF
3	PW	Boiler (1)	166.3	64.8	587.4	7.8	PM-ST; NOX,CO,VOC-EF
		Veneer Dryer (3)	4.1	--	--	168.2	ST
		Press (3)	--	--	--	.31	EF
4	PW	Boiler (1)	124.0	75.1	680.9	9.0	PM-ST; NOx,CO,VOC-EF
		Veneer Dryer (3)	4.1	--	--	169.2	ST
		Press (4)	--	--	--	.31	EF
5	PW	Boiler (2)	61.1	191.5	1172.0	8.0	PM-ST; NOx,CO,VOC-EF

APPENDIX E

WOOD PANEL EQUIPMENT/FACILITY EMISSIONS

Facility	**Type**	**Equipment** (Number of units)	**PM/PM10 Emissions Per Unit**	**NOx Emissions Per Unit**	**CO Emissions Per Unit**	**VOC Emissions Per Unit**	**Basis**
			Actual (tpy)	Actual (tpy)	Actual (tpy)	Actual (tpy)	Emission Factor (EF) or Stack Test (ST)
		Veneer Dryer (8)	3.4	--	--	137.0	ST
6	PW	Boiler (1)	44.5	75.2	681.7	9.0	PM-ST; NOx,CO,VOC-EF
		Veneer Dryer(3)	4.2	--	--	172.3	ST
		Press (3)	--	--	--	.32	EF
7	OSB	Rotary Dryers from WESP	68.3	50	217.5	165.9	PM-ST; NOx,CO, VOC-EF
		Press (1)	18.0	.4	9.7	6.9	ST
8	OSB	Dryer (1)	--	--	--	--	ST
		Press (1)	--	--	--	--	ST
8a	OSB	Dryer (5)	58.0	17.0	20.0	150	ST
		Press Vents (2)	9.2	--	--	40	ST
8b	OSB	Flake Dryer (4)	57.3	46.0	130.3	217.3	ST
		Press Vent (1)	41.0	1.0	22.0	16.0	ST
8c	OSB	Flake Dryers (WESP)	30.9	51.7	185.8	281.1	ST

		Press Vent (1)	40.0	1.0	22.0	15.0	ST
8d	OSB	Boiler	98.6	98.6	128.2	44.4	PM,NOx,CO-ST; VOC-EF
		Flake Dryers (2) WESP	9.4	17.1	113.0	233.9	PM,VOC-ST; NOC,CO-EF
		Press Vents (3)	18.2	.4	9.8	7.0	ST
9	MDF	Boiler (1)	64.0	61.0	61.0	27.0	ST
		Flash Tube Dryer (2)	86.0	--	--	No Estimate	EF
		Press (1)	No Estimate	No Estimate	No Estimate	No Estimate	--
10	MDF	Boiler (1)	181.2	245.6	696.0	7.6	ST
		Fiber Dryer (2)	35.7	--	--	30.6	ST
		Press (1)	13.0	--	4.0	32.3	ST
11	MDF	Boiler (1)	661.0	Not Tested	1870.0	Not Tested	ST
		RTO for Dryer (2)	35.5	65.3	2.67	2.6	ST
		RTO for Press (1)	1.53	20.06	3.32	.6	ST
12	MDF	Boiler Stacks (2)	41.6	Not Tested	Not Tested	Not Tested	ST
		Dryer (6)	159.0	Not Tested	53.0	96.8	ST
		Press Vents (9)	10.1	Not Tested	2.2	19.7	ST
13	PB	Boiler (1)	36.6	9.6	126.17	.87	ST
		Dryer (4)	48.5	12.7	20.1	44.9	ST
		Press (1)	93.5	60.5	207.8	312.8	ST
14	PB	Dryer (4)	130.5	47.1	36.9	10.8	ST
		Press (2)	12.1	--	1.1	17.3	ST
15	PB	Boiler (1)	17.0	7.3	63.7	.85	PM-ST; NOx,CO,VOC-

							EF
		Dryer (2)	27.9	5.6	58.1	90.8	EF
		Press (1)	--	--	--	102.8	EF
16	PB	Dryer (2)	39.0	5.8	60.5	54.8	PM-ST; NOx,CO,VOC-EF
		Press (1)	--	--	--	80.5	EF
17	PB	Dryer (2)	29.4	7.0	72.9	66.7	PM-ST; NOx,CO,VOC-EF
		Press (1)	--	--	--	102.1	EF
18	PB	Boiler (1)	30.7	8.6	73.3	.99	PM-ST; NOx,CO,VOC-EF
		Dryer (2)	35.6	6.3	65.3	68.9	PM-ST; NOx,CO,VOC-EF
		Press	--	--	--	93.2	EF

APPENDIX F

Regulation Application

CLEAN AIR ACT

The Clean Air Act (CAA), as amended in 1990, is intended to protect human health and the environment by reducing emissions of specified pollutants at their sources, thus allowing the achievement and maintenance of maximum acceptable pollution levels in ambient air. The CAA also contains provisions which seek to prevent presently existing unpolluted areas from becoming significantly polluted in the future. Regulations implementing the multitude of amendments enacted in 1990 will be promulgated pursuant to statutory deadlines for many years to come. Where regulations under the amendments have not yet been promulgated, requirements which existed prior to the 1990 amendments will continue to be enforceable until amended or new requirements are promulgated.

National Ambient Air Quality Standards

As in prior versions of the CAA, Section 109 continues to require that EPA establish national ambient air quality standards (NAAQS) to protect public health and welfare from air pollutants. These standards will apply in all areas of the country. "Primary" NAAQS must be designed to protect human health while building in an adequate margin for safety, whereas "secondary" NAAQS protect public welfare, including wildlife, vegetation, soils, water, property, and personal comfort. EPA has promulgated NAAQS for six air pollutants (criteria pollutants): ozone, carbon monoxide (CO), particulate matter (PM-10), sulfur dioxide (SO_2), nitrogen dioxide and lead.

State Implementation Plan

The States, through adoption of plans known as State Implementation Plans (SIPs), are required to establish procedures to achieve and maintain all NAAQS promulgated by EPA. EPA has designated 247 Air Quality Control Regions (AQCRs). Each AQCR has been evaluated to determine whether the NAAQS for each of the criteria pollutants has been met. AQCRs which do not meet the NAAQS for any of the criteria pollutants are designated as "non-attainment" for those pollutants. Thus, one AQCR may be attainment for some pollutants and non-attainment for others.

The SIP program dates back to the 1970 Clean Air Act, which required States to promulgate SIPs by 1972 to assure attainment of air quality standards by 1977. Having not met that goal, the 1977 amendments continued the program, requiring additional controls designed to achieve attainment by 1982, or at the latest 1987. While the goals of the SIP program were again not reached, the 1990 amendments have further continued the effort, adding several requirements which may increase the effectiveness of the program, including the use of modeling and other specified analytical techniques to demonstrate the ability to achieve attainment and a wide range of specified control requirements. An additional advantage of the new SIP program is that under the 1990 amendments it is no longer the primary mechanism for implementation of the NAAQS. Instead, the comprehensive permit program under the 1990 amendments will assume a large part of that burden by detailing the specific requirements applicable to individual sources, thereby resolving any uncertainties as to what requirements are applicable.

A SIP must contain strategies designed to meet targets for attainment of any NAAQS for which an area is non-attainment by prescribed dates. Since each State is required to have a plan for maintaining or attaining the NAAQS, each SIP will contain different requirements. SIPs must meet Federal requirements, but each State may choose its own mix of emissions for stationary and mobile sources to meet the NAAQS. Basic components of the SIP include, but are not limited to: general provisions, stack testing, standards for pollutants, test methods and procedures, notification, records and reporting, and industry specific standards. The deadline for attainment of primary NAAQS is no more than five (5) years after the area was designated non-attainment, although EPA has the authority to extend the deadline for up to five (5) additional years. Attainment for secondary NAAQS must be achieved "as expeditiously as practicable."

In order to accomplish attainment, States must impose controls on existing sources to reduce emissions to the extent necessary to ensure achievement of the NAAQS. In attainment areas, new sources and those which are undertaking modifications which will increase emissions by more than a *de minimis* amount must obtain State construction permits after demonstrating that anticipated emissions will not exceed allowable limits. In non-attainment areas, emissions from new or modified sources must be offset by emissions reductions from existing sources. Existing sources must comply with standards set forth in the State regulations within a time specified in the State regulations. Compliance is with standards for opacity, pollutant emission levels as determined by emission tests, installation of continuous monitoring devices, notification and recordkeeping, and reporting requirements.

Each State must submit a proposed SIP to EPA for approval within three (3) years of designation as non-attainment. Failure to submit a SIP, failure to submit an adequate SIP or failure to implement a SIP may subject a State to the imposition of sanctions such as increased offset ratios for stationary sources, prohibition of Federal highway grants or a ban on air quality grants. For ozone non-attainment areas, failure to attain the NAAQS will result in reclassification of the area, thus imposing more stringent control requirements and imposition of financial penalties on stationary sources in sever or extreme non-attainment areas. Where an acceptable SIP is not submitted by a State, EPA will be required to propose and enforce a Federal Implementation Plan for that State. EPA and the States have concurrent enforcement authority for SIPs.

Deadlines and control requirements imposed upon non-attainment areas vary depending upon the severity of the existing air pollution problem, with correspondingly more stringent control requirements and longer deadlines applying to more polluted areas. The CAA creates five (5) classes of ozone non-attainment and two (2) categories each for carbon monoxide and PM-10 non-attainment areas.

Prevention of Significant Deterioration

The purpose of Prevention of Significant Deterioration (PSD), under 40 CFR Part 52 (§52.21), is to avoid significant future degradation of the nation's clean air areas. A clean air area is one where the air quality is better than the ambient primary or secondary standard. Designation is pollutant specific so that an area can be non-attainment for one pollutant but clean for another. PSD applies only to new and modified sources in attainment areas. Clean air areas are divided into three categories: Class I includes wilderness areas and other pristine areas, where only minor air quality degradation is allowed; Class II includes all other attainment and non-classified areas where moderate degradation is permitted; and Class III includes selected areas that States designate for development where substantial degradation is permitted. In no case would PSD allow air quality to deteriorate below secondary NAAQS.

"Baseline" is the existing air quality for the area at the time of the first PSD permit application. "Increments" are the maximum mount of deterioration that can occur in a clean air area over baseline. Increments in Class I areas are smaller than those for Class II areas and Class II increments are smaller than those for Class III areas. For purposes of PSD, a major emitting source is one which falls within 28 designated categories and emits or has the potential to emit more than 100 tons per year of the designated air pollutant. Potential to emit is defined as the source's capability at maximum design capacity to emit a pollutant, except as constrained by federally-enforceable conditions (which include the effect of installed air pollution control equipment and restrictions on the hours of operation, or the type or amount of material combusted, stored or processed). A source that is not within the 28 designated categories is a major source if it emits more than 250 tons per year. A major source modification, identified as a physical change or change in a method of operation at an existing major source that will result in a "significant net emissions increase" of any regulated pollutant, is also subject to PSD. The amount of emissions which qualifies as significant is defined as greater than the specified *de minimis* level of any pollutant and varies for the regulated pollutants, as indicated below.

Pollutant	Design air *De Minimis* emission rate (tpy)
Nitrogen Oxides (NO_x)	40
Particulate Matter (PM/PM-10)	25/15
Ozone (VOCs)	40
Carbon Monoxide (CO)	100

Under this program, new "major stationary sources" and "major modifications" to such sources located in attainment areas must obtain a permit before beginning construction. Permit requirements include installation of Best Available Control Technology (BACT) for each regulated pollutant emitted in significant amounts, assurance that the new emissions will not exceed NAAQS or any maximum allowable "increment" for the area, and assurance that the new emissions will not adversely impact any other air quality related values, such as visibility, vegetation or soils.

New Source Applicability to PSD Requirements

1. Define the source
   - includes all related activities classified under the same 2-digit SIC Code number
   - must have the same owner or operator
   - must be located on contiguous or adjacent properties
   - includes all support facilities

2. Define applicability thresholds for major source as a whole (primary activity)
   - 100 tpy for individual emissions units or groups of units th at are included in the list of 28 source categories identified in Section 169 of the CAA
   - 250 tpy for all other sources

3. Define project emissions (potential to emit)
   - Reflects federally-enforceable air pollution control efficiency, operating conditions, and permit limitations
   - Determined for each pollutant by each emissions unit
   - Summed by pollutant over all emissions units
   - Includes fugitive emissions for 28 listed source categories and sources subject to NSPS or NESHAPs as of August 7, 1980

4. Assess local area attainment status
   - Area must be attainment or unclassifiable for at least one criteria pollutant for PSD to apply

5. Determine if source is major by comparing its potential emissions to appropriate major source threshold
   - Major if <u>any</u> pollutant emitted by defined source exceeds thresholds, regardless of area designation, I.e., attainment, nonattainment, or non-criteria pollutants
   - Individual unit is major if classified as a source in one of the 28 regulated source categories and emissions exceed an applicable 100-tpy threshold

6. Determine pollutants subject to PSD review
   - Each attainment area and non-criteria pollutant emitted in "significant" quantities

- Any emissions or emissions increase from a major source that results in an increase of 1 microgram per cubic meter (24 hour average) or more in a Class I area if the major source is located or constructed within 10 kilometers of that Class I area.

Existing Source - Major Modification Applicability

A modification is subject to PSD review only if (1) the existing source that is modified is "major", and (2) the **net emissions increase** of any pollutant emitted by the source, as a result of the modification, is "significant", i.e., equal to or greater than the defined deminimis emissions rates. Note also that any net emissions increase in a regulated pollutant at a major stationary source that is located within 10 kilometers of a Class I area, and which will cause an increase of 1 microgram per cubic meter (24 hour average) or more in the ambient concentration of that pollutant within that Class I area, is "significant".

Net emissions change = Emissions increases associated with the proposed modification
minus Source-wide creditable contemporaneous emissions decreases
plus Source-wide creditable contemporaneous emissions increases

Major Modification Thresholds

Major modification thresholds for nonattainment areas are those same significant emissions values used to determine if a modification is major for PSD. Only criteria pollutants for which the location of the source has been designated nonattainment are eligible for evaluation.

PSD Review Exemptions

Detailed PSD review requirements will not apply to the following examples:

- A potable source which: (1) has previously received an equivalent PSD permit, (2) will have only temporary emissions at the new locations, and (3) will not impact Class I areas or areas where applicable increments are known to be violated.

- With respect to a particular pollutant, any tempo rary source which will not impact Class I areas or areas where applicable increments are know to be violated.

- Net emission increases resulting from:

  - Routine maintenance, repair, and replacement

  - Use of an alternative fuel or raw material required by the Energy Supply and Environmental Coordination Act or the Federal Power Act

- Use of an alternative fuel by provision of the Clean Air Act related to prevention of economic disruption or unemployment

- Use of municipal solid waste as a fuel at a steam generating plant

- Use of an alternative fuel or raw material which a source capable of using and permitted to use before January 6, 1975, or permitted to use under a PSD permit.

- An increase in hours of operation or production rate if not prohibited by any permit condition established after January 6, 1975

- A change in ownership of a stationary source

New Source Review Applicability

For the purpose of nonattainment New Source Review (NSR), a major stationary source is:

- any stationary source which emits or has the potential to emit 100 tpy of any criteria pollutant subject to regulation under the CAA, or

- any physical change or change in method of operation at an existing non-major source that constitutes a major stationary source by itself.

Note that the 100 tpy threshold applies to all sources.

Nonattainment Area

For major new sources and major modifications in nonattainment areas, LAER (lowest achievable emission rate) is the most stringent emission limitation derived from either of the following:

- the most stringent emission limitation contained in the implementation plan of any state for such class or category of source; or

- the most stringent emission limitation achieved in practice by such class or category of source.

By definition, LAER can not be less stringent than any applicable new source performance standard (NSPS).

New Source Performance Standards

With the exception of the extension and establishment of deadlines for EPA's proposal of various regulations, the New Source Performance Standards (NSPS) program remains largely unchanged by the 1990 amendments. NSPS establishes nationally uniform, technology-based standards for categories of new industrial facilities by providing maximum emission levels for new or extensively modified major stationary sources as defined in 40 CFR Part 60. The emission levels are determined by the best "adequately demonstrated" continuous control technology available, taking costs into account. Regulations for source categories listed prior to November 15, 1990, must be proposed in phases, beginning on November 15, 1992. Standards for new categories listed after November 15, 1990, must be proposed within one (1) year of listing and must be finalized within one (1) year after proposal.

The owner or operator of a new or extensively modified major source is required to demonstrate compliance with an applicable NSPS within 180 days of initial start-up of the facility and at other times required by EPA. Primary authority for enforcement of NSPS lies with EPA unless that authority is delegated to States, in which case EPA and the State have concurrent enforcement authority.

The wood panel industry utilizes boilers for the production of steam for a variety of uses at a plant (see Chapter 3, process equipment and emissions). The NSPS regulates steam generating units depending on the construction/modification date, the size of the unit in units of million BTU per hour, and the type of fuel burned in the unit. Subparts D (§60.40), Da (§60.40a), Db (§60.40b), Dc (§60.40c) in 40 CFR Part 60 list the standards of performance for the various regulated steam generating units. The table below summarizes the applicability information from the 40 CFR part 60.

SUBPART	FUEL TYPE	APPLICABLE SIZE (MM BTU/HR)	APPLICABLE DATE
D	Fossil-Fuel	>250	after 8/17/71
D	Lignite	>250	after 12/22/76
Da*	Fossil-Fuel	>250	after 9/18/78
Db	Any	>100	after 6/19/84
Db	Coal	100-250	after 6/19/84 on or before 6/19/86
Db	Coal	>250	after 6/19/84 on or before 6/19/86
Db	Oil	100-250	after 6/19/84 on or before 6/19/86
Db	Oil	>250	after 6/19/84 on or before 6/19/86
Dc	Any	10-100	after 6/9/89

* Steam generating units meeting the applicability requirements for Subpart Da, are not subject to Subpart D or Db.

Although many of the boilers found in the wood panel industry were constructed during the plant start-up and thus may not fall within the regulated time period, boilers which have been modified according to the definition of "modification" in 40 CFR Part 60, §60.14 may also be subject to the regulations.

Generally, the regulations for steam generating units have pollutant emission rates for sulfur dioxide, particulate matter, and nitrogen oxides. Additionally, compliance and performance test methods and procedures for each pollutant are included, as well as emission monitoring requirements and reporting and recordkeeping. Consult the specific section for which the unit is applicable to determine the exact applicable regulations.

When reviewing applicability of the NSPS or any other federal program to a source, it is important to understand that delegations of the programs from the federal agency to the State or local agency play a role in determining the lead regulatory agency (federal, state, local) in enforcement of the program. This information should be available from the EPA NSPS or PSD program coordinator.

Continuous Monitoring System

NSPS Subpart D, requires that continuous monitoring systems be operated and data recorded during all periods of operation of the affected facility, except during continuous monitoring system breakdowns and repairs. Data is recorded during calibration checks, and zero and span adjustments. The procedures under §60.13 shall be followed for installation, evaluation, and operation of the continuous monitoring systems.

Hazardous Air Pollutants

Prior to the enactment of the 1990 amendments, Section 112 of the CAA required the establishment of National Emission Standards for Hazardous Air Pollutants (NESHAPs) to regulate exposure to dangerous air pollutants that are so localized that the establishment of NAAQS is not justified. NESHAP standards were to be based on health effects, with strong reliance on technological capabilities. They applied to both existing and new stationary sources. During the 20 years in which this program existed, effective regulations for only seven (7) substances were enacted: benzene, beryllium, asbestos, mercury, vinyl chloride, arsenic, and radionuclide emissions.

As rewritten in 1990, the goal of Section 112 remains the same - to protect public health and the environment from toxic air pollutants for which NAAQS will not be established. While the new program requires standards to be set for categories and subcategories of sources that emit hazardous air pollutants, rather than for the air pollutants themselves as under the NESHAP program, the seven (7) NESHAPs promulgated prior to the amendments will generally remain applicable until they are revised pursuant to the timetables established in the new Section 112.

Under the 1990 amendments, two types of sources have been identified for purposes of establishing emission standards - "major sources", which include stationary sources or a group of stationary sources within a contiguous area and under common control that emit or have the potential to emit 10 tons per year of a single listed hazardous air pollutant or 25 tons per year of any combination of listed hazardous air pollutants; and "area sources", which include numerous small sources that may cumulatively produce significant quantities of a pollutant resulting in a threat of adverse effects on human health or the environment. An initial list of 189 air pollutants requiring regulation was established by Congress and EPA has been tasked with the responsibility for establishing lists of categories and subcategories of major sources and area sources subject to emission standards.

Major Sources

EPA is required to set technology-based standards for sources of the listed pollutants which are designed to achieve "the maximum degree of reduction in emissions" (Maximum Achievable

Control Technology - MACT) while taking into account costs and other health and environmental impacts. The standards for new sources "shall not be less stringent than the most stringent emissions level that is achieved in practice by the best controlled similar source" in the same category or subcategory. For existing sources, the standards may be less stringent than those for new sources, but in most circumstances must be no less stringent than the emissions control achieved by the best performing 12% of sources in the category or subcategory [or five (5) sources in a category with less than 30 sources]. Existing sources are given three (3) years following the promulgation of standards to achieve compliance, with the possibility of a one-(1)-year extension. Sources that voluntarily reduce emissions by 90% before an applicable MACT is proposed (95% for hazardous particulates) may be granted on (1) six-(6)-year extension from the MACT. Solid waste incinerators will be required to comply with both these hazardous air pollutant standards and the new source performance standards to be promulgated pursuant to Section 111 of the CAA.

The second provision of Section 112 relating to major sources sets health-based standards to address situations in which a significant residual risk of adverse health effects or a threat of adverse environmental effects remains after installation of MACT. Within six (6) years of enactment of the CAA, and after consultation with the Surgeon General and opportunity for public comment, EPA must report to Congress regarding the public health significance of the residual risks, technologically and commercially available methods and costs of reducing such risks and legislative recommendations to address such residual risks. If Congress does not act on the recommendations submitted by EPA, the EPA must issue residual risk standards for listed categories and subcategories of sources as necessary to protect public health with an ample margin of safety or to prevent adverse environmental effects.

Area Sources

The goal of the area source program is to reduce the incidence of cancer attributable to stationary area sources by at least 75% through a comprehensive national strategy for emissions control in urban areas. By November 15, 1995, EPA is required to identify the 30 hazardous air pollutants emitted from area sources that pose the most significant risks to public health in the largest number of urban areas and the source categories and subcategories of those pollutants. Area sources representing at least 90% of the emissions of the 30 identified pollutants will be subject to regulations to be promulgated by EPA by November 15, 2000.

Prevention of Sudden Catastrophic Releases

As added by the 1990 amendments, Section 112 of the CAA imposes a general duty on owners and operators of stationary sources which handle hazardous substances to: identify hazards which may result from releases, design and maintain safe facilities, take action to prevent releases, and minimize the consequences of accidental releases that do occur. It also requires EPA to promulgate a list of substances which, in the event of an accidental release, may reasonably be anticipated to cause death, injury, or serious adverse health and environmental effects, as well as threshold quantities for each of those regulated substances. Requirements for release prevention, detection and correction of regulated substances must be promulgated by EPA. Among the requirements will be preparation and implementation of risk management plans by owners and operators of facilities with regulated amounts greater than the threshold quantity.

Emergency policies and the opportunity to secure relief in the district courts is provided to EPA to protect against an imminent and substantial endangerment to health or the environment as a result of an actual or threatened release of a regulated substance. An independent, five-member Chemical Safety and Hazard Investigation Board to be appointed by the President will investigate any accidental release that results in a fatality, serious injury or substantial property damage, and will issue a report to EPA and OSHA recommending regulations for preparing risk management plans and general requirements for preventing and mitigating the potential adverse effects of accidental releases.

Permitting

Under the Clean Air Act as it existed prior to the 1990 amendments, permits were required for only a limited number of facilities. While these requirements will continue to apply until new regulations are promulgated, the 1990 amendments have expanded the permit program to require most regulated stationary sources to have permits.

The new permitting program, patterned after the NPDES program, is designed to consolidate all operation and control requirements in one permit. However, unlike the NPDES program which focuses on individual sources within a facility, air permits are expected to be issued to a facility as a whole. As a result of this comprehensive program, greater consistency is expected and facilities will not be subjected to conflicting requirements.

Permits are required for any facility that qualifies as a "major source", which generally includes any source emitting more than 100 tons of pollutants per year, but extends to smaller sources in the more seriously polluted non-attainment areas. Permits are also required for major sources and area sources subject to regulation for emissions of hazardous air pollutants under Section 112 and all sources subject to NSPS.

Regulations establishing the numerous requirements for state permit programs must be promulgated by EPA by November 15, 1991. States must then develop and submit to EPA an operating permit program for approval by November 15, 1993. If all or any part of the program is disapproved by EPA, the States must correct the deficiencies and resubmit the program. A failure to timely submit a program or correct deficiencies will result in sanctions. If a program is not completely approved within 2 years after initial submission of the program to EPA or by November 15, 1995, whichever is earlier, EPA must promulgate and administer a permit program for the State.

Permit applications must be filed within 12 months after the permit program takes effect and must include a compliance plan for the facility. The permits, as issued, will contain enforceable emission limitations and standards, a schedule compliance, and compliance certification, inspection, entry, monitoring and reporting requirements. Compliance with a permit will, to some extent, shield a source from enforcement actions. The extent of the protection provided by compliance will be governed by EPA's permitting regulations to be promulgated by November 15, 1991.

Enforcement

The 1990 Amendments greatly expanded enforcement options available under the CAA and impose heavy penalties, both civil and criminal, for violations of the CAA.

Administrative penalties of up to $25,000 per day, to a maximum of $200,000, may be imposed by EPA for violations of any requirement, prohibition, permit, rule, or order without the initiation of a court proceeding. These penalties can be overturned only if, on judicial review, they are not supported by substantial evidence. Field investigators are also authorized to issue "field citations" imposing penalties of up to $5,000 per day per violation for minor violations observed while on site. Administrative orders requiring specific actions to comply with the CAA may be issued where compliance can be achieved within 1 year. Additionally, private citizens are now authorized to bring citizen suits seeking civil penalties for violations of the CAA where neither EPA nor the State is "diligently prosecuting a civil action" to require compliance, or seeking to compel EPA to discharge a non-discretionary duty, such as promulgating regulations by statutory deadlines.

Knowing violations of many provisions of the CAA qualify as felony crimes, punishable by fines for individuals of up to $250,000 and imprisonment up to 5 years, with each day counting as a separate violation. Fines for corporations may be up to $500,000 per day per violation. Penalties may be doubled for second convictions. The negligent release of a hazardous air pollutant or extremely hazardous substance under SARA that puts another person in imminent danger of death or serious bodily injury is punishable by fines and imprisonment for up to 1 year, while knowingly releasing such substances is punishable by up to $250,000 per day and 15 years imprisonment for individuals and up to $1 million per day for businesses.

EPA is also authorized to pay a "bounty" of up to $10,000 for information leading to a criminal conviction or a judicial or administrative civil penalty for violations of the CAA.

The CAA contains a presumption that once a violation which is likely to be of a continuing nature is proven, the violation is presumed to continue until full compliance is achieved unless the defendant can prove that the violation ceased.

CLEAN WATER ACT

Through the 1950s and 1960s, emphasis was on the States setting ambient water quality standards and developing plans to achieve these standards. In 1972, the Federal Water Pollution Control Act was significantly amended. These changes emphasized a new approach, combining water quality standards and effluent limitations (i.e., technology-based standards). The amendments called for compliance by all point-source discharges with the technology-based standards. A strong Federal enforcement program was created and substantial monies were made available for construction of sewage treatment plants. The Federal Water Pollution Control Act was amended in 1977 to address toxic water pollutants and in 1987 to refine and strengthen priorities under the Act as well as enhance EPA's enforcement authority. Since the 1977 amendments, the Federal Water Pollution Control Act has been commonly referred to as the Clean Water Act (CWA).

State Water Quality Standards and Water Quality Management Plans

Section 303 of the CWA authorizes the States to establish ambient water quality standards and water quality management plans. If national technology standards are not sufficient to attain desired stream water quality, the State shall set maximum daily allowable pollutant loads (including toxic pollutants) for these waters and, accordingly, to determine effluent limits and compliance schedules for point sources to meet the maximum daily allowable loads.

The National Pollutant Discharge Elimination (NPDES) Program

This program was established by Section 402 of the CWA and, under it, EPA and approved States have issued more than 50,000 NPDES permits. Permits are required for all point sources from which pollutants are discharged to navigable waters. A NPDES permit is required for any direct discharge from new or existing sources. Indirect discharges through POTWs are regulated under a separate program (see discussion of pretreatment standards below). In 1979 and 1980, the permit program was revised and one of the new features was the use of Best Management Practices (BMPs) on a case-by-case basis to minimize the introduction of toxic and hazardous substances into surface waters. BMPs are industry practices used to reduce secondary pollution (e.g., raw material storage piles shall be covered and protected against rain and runoff). BMPs do not have numerical limits and, therefore, are different from effluent limits.

Section 304 of the CWA sets restrictions on the amount of pollutants discharged at industrial plant outfalls. Amounts are usually expressed as weight per unit of product (i.e., 0.5 lb/1,000 lb product manufactured). The standards are different for each industry. Effluent guidelines are applied to individual plants through the NPDES permit program.

There are three levels of technology for existing industrial sources: Best Practicable Control Technology (BPT), Best Conventional Technology (BCT), and Best Available Technology Economically Achievable (BAT). Under the 1972 Act, BPT was intended to be put in place by industry in 1977 and BAT in 1983. These timetables have been modified by subsequent amendments.

The 1987 CWA Amendments modified the compliance deadlines for the following:

- BPT limits requiring a substantially greater level of control based on a fundamentally different control technology

- BAT for priority toxic pollutants

- BAT for other toxic pollutants

- BAT for nonconventional pollutants

- BCT for conventional pollutants

For each technology the new deadline requires compliance "as expeditiously as practicable, but in no case later than 3 years after the date such limitations are promulgated ... and in no case later than March 31, 1989."

The NSPS are closely related to BAT for existing sources but are not quite the same. NSPS are different for each industrial category. These standards must be achieved when the new industrial source begins to discharge. NSPS permits will be effective for a period of 10 years vs. 5 years or less for the BPT and BAT-type permits. This 10-year protection insulates against change in BCT or BAT requirements but does not hold against Section 307(a) toxic pollutants standards or against "surrogate" pollutants that are used to control hazardous or toxic pollutants.

A permit application must be made. Adequate information must be submitted including basic facility descriptions, SIC codes, regulated activities, lists of current environmental permits, descriptions of all outfalls, drawings, flows, treatment, production, compliance schedules, effluent characteristics, use of toxics, potential discharges, and bio-assay toxicity tests performed.

Applicants must conduct analytical testing for pollutants for BOD, COD, TOC, TSS, ammonia, temperature, and pH. The applicant, if included within any of the 34 "primary industry" categories, must sample for all toxic metals, cyanide, and phenols given in EPA Application Form 2C and for specified organic toxic pollutant fractions.

The applicant must list hazardous substances believed to be present at the industrial plant. Testing is not required but analytical results must be provided, if available.

NPDES Permit

The NPDES permit, issued by EPA or the State, enforces Federal effluent limitations promulgated for individual industrial categories; NSPS; toxic effluent standards; State water quality standards under Section 303 of the CWA, if any are applicable; and hazardous substances otherwise regulated under Section 311 of the CWA that may be incorporated under the NPDES permit instead. Permit elements include the amount of pollutants to be discharged expressed in terms of average monthly and maximum daily loads; compliance schedules, if applicable standards cannot be met now; and monitoring, testing, and reporting requirements.

Routine Noncompliance Reports - The Discharge Monitoring Form

The Discharge Monitoring Report (DMR) gives a summary of the discharger's records on a monthly or quarterly basis for flow measurement, sample collection, and laboratory analyses. Noncompliance reports must be submitted quarterly on the cause of noncomplying discharges, period of noncompliance, expected return to compliance and plans to minimize or eliminate recurrence of incident.

Emergency Reporting

- **Health**: EPA shall be notified within 24 hours of noncompliance involving discharge of toxic pollutants, threat to drinking water, or injury to human health.

- **Bypass**: Noncompliance due to intentional diversion of waste shall be reported promptly to the permitting agency and may be permissible if essential to prevent loss of life or serious property damage.

- **Upset**: Temporary noncompliance due to factors beyond the reasonable control of the permittee shall be promptly reported to the agency.

The 1987 CWA Amendments establish a schedule for the regulation of municipal and industrial stormwater discharges under NPDES permits. Initially, (before October 1, 1992), only major dischargers and those who are significant contributors of pollutants will be required to obtain permits.

Pretreatment Standards for Indirect Discharges to Publicly-Owned Treatment Works

Coverage

New and existing industrial users who discharge to POTWs are subject to general and categorical pretreatment standards. The categorical standards are primarily directed to control toxic pollutants in specific industries. Note that localities with approved pretreatment programs may have imposed local limits, which are enforceable by EPA.

Requirements

- <u>General Pretreatment Standards</u>

  Prohibit fire or explosion hazards, corrosivity, solid or viscous obstructions, "slug" discharges, and heat sufficient to inhibit biological activity at POTWs.

- Categorical Standards

  - Standards to be expressed as concentration limits or mass weight per unit of production.

  - Source must be in compliance 3 years after promulgation of standards.

  - Variances can be obtained for fundamentally different factors or if industrial pollutants are consistently being removed by POTW.

- Reports

  Users must provide appropriate agency (EPA, State, or POTWs having approved pretreatment programs) with basic information; SIC code; average and maximum daily discharge; characteristics or pollutants, applicable standards and certification whether standards are being met and, if not, what pretreatment is necessary; and a compliance schedule.

- Monitoring, Sampling, and Analysis

  Users shall submit sampling data for each regulated pollutant in discharge.

- Progress Reports

  Reports and information shall be submitted at 6-month intervals.

Nonpoint Source Pollution Control

Section 208 of the CWA provides for control of nonpoint source pollution and directs States to establish planning bodies to formulate areawide pollution control plans. NPDES permits cannot be issued where the permit may conflict with an approved Section 208 plan.

The 1987 CWA Amendments require States or EPA to develop nonpoint source management programs under Section 319.

Municipal and Industrial Stormwater Discharges

For some time there has been considerable debate over whether permits should be required for stormwater discharges from point sources, particularly those municipal or industrial discharges which may well contain toxic and other pollutants. The 1987 Amendments provide that five (5) types of stormwater discharges will be regulated under NPDES:

1. Discharges which have NPDES permits issued as of February 1987

2. Discharges "associated with industrial activity"

3. Discharges "from a municipal separate storm sewer system se rving a population of 250,000 or more"

4. Discharges "from a municipal separate storm sewer system serving a population of 100,000 or more but less than 250,000"

5. Other discharges designated by the EPA administrator or the State if such discharge "contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United State"

Final regulations governing stormwater discharges were promulgated in November 1990.

Dredge or Fill Discharge Permit Program

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States. Dredged material is excavated or dredged from a water body. Fill material is that material used to replace water with dry land. The Section 404 permit program is administered by the U.S. Army Corps of Engineers. EPA provides guidelines for the issuance of permits by the Corps of Engineers. States may assume responsibility for portions of the program.

Discharge of Oil and Hazardous Substances

Section 311 of the CWA prohibits discharges of oil or hazardous substances in quantities that may be harmful to waters of the United States. The appropriate Federal agency must be immediately notified of any spill of a "reportable quantity." Section 311 provides for cleanup of spills and requires plans for preparation of Spill Prevention, Control, and Countermeasures (SPCC) plans.

Over 300 substances have been defined as hazardous under Section 311 and each of these substances has a "reportable quantity" (40 CFR, Parts 116 and 117, 1980).

A person or corporation who properly notifies the Agency of the discharge of a reportable quantity of oil or hazardous substance is immune from criminal prosecution but is liable for civil penalties. Additionally, those who cause the spill are liable for the costs of cleanup and removal. If the Federal government must clean up the spill, the discharger of the spill is liable for cleanup costs. There are maximum liability limits depending upon the type of facility and spill. These limits do not apply if the discharge resulted from willful negligence or willful misconduct of the owner.

Certain discharges of oil and hazardous material that flow from a point source may be excluded from Section 311 liability if, during preparation of the NPDES permit covering that facility, conditions are added to the permit to avoid the occurrence of a spill.

Enforcement

Section 309 of the CWA provides several enforcement options which can result in large penalties to violators.

Criminal violations can result in penalties for individuals of up to $250,000 and imprisonment for 15 years for "knowing endangerment", while penalties against organizations for similar violations can reach $1,000,000. "Knowing violations" result in fines of $5,000 to $50,000 per day and imprisonment of up to 3 years per day of violation. "Negligent violations" carry penalties of $2,500 to $25,000 and up to 1 year imprisonment per day of violation. Falsification of reports is punishable by a $10,000 fine and imprisonment of up to 2 years. All penalties may be doubled for second offenses.

Civil penalties may be assessed in an amount up to $25,000 per day of violation. Factors to be considered by the court in determining the amount of a civil penalty include the seriousness of the violation, the economic benefit to the defendant as a result of the violation, compliance history, good-faith efforts applied by the violator and the economic impact of the penalty on the violator.

Administrative penalties may also be imposed against violators through the initiation of an administrative penalty proceeding. Section 309(g) provide for two classes of penalties, Class I and Class II, which differ with respect to the limits on the penalties which can be imposed and the procedures which must be followed in order to impose those penalties.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976[*]

The Resource Conservation and Recovery Act (RCRA), as enacted in 1976, was designed to establish "cradle-to-grave" control of hazardous wastes by imposing extensive requirements on those who generate and/or handle such wastes. RCRA applies primarily to current activities at active facilities, yet there is authority for addressing imminent hazards and for taking corrective actions based upon past actions. Although RCRA has been amended several times, the most significant amendments are the Hazardous and Solid Waste Amendments (HSWA) of 1984. HSWA requires, among other things, that regulations be promulgated to address underground storage tanks, to establish a schedule for restricting/prohibiting the land disposal of hazardous wastes, and to revamp the toxicity characteristic as a means for determining whether a waste is hazardous. (The process of promulgating regulations in these areas is ongoing, but almost complete.)

Solid wastes, if land disposed, are regulated through State programs under Subtitle D of RCRA. Hazardous solid wastes are subject to regulation in their generation, transport, treatment, storage, and disposal under Subtitle C of RCRA. Subtitle C of the statute authorizes a comprehensive Federal program to regulate hazardous wastes from generation to ultimate disposal. A waste is hazardous under Subtitle C if it is listed by EPA as hazardous, or it exhibits a hazardous characteristic (corrosivity, reactivity, ignitability, and toxicity) and is not delisted or excluded from regulation. There are special management provisions for hazardous wastes created by small quantity generators and hazardous wastes that are intended to be reused or recycled.

Solid waste includes garbage, refuse and sludge, other solid, liquid, semi-solid, or contained gaseous material which is discarded, has served its intended purpose, or is a mining or manufacturing byproduct. Most industrial and commercial byproducts can qualify as a solid waste. Exclusions from solid waste include domestic sewage, irrigation return flows, materials defined by the Atomic Energy Act, *in situ* mining waste and NPDES point sources.

Solid wastes excluded from regulation as hazardous solid wastes are household waste; crop or animal waste; mining overburden and wastes from processing and benefication of ores and minerals; flyash, bottom ash waste, slag waste and flue gas emission control waste and drilling fluids from energy development. A waste can be "delisted" from the hazardous waste listing or excluded for other reasons. Some materials intended to be reused or recycled are not fully regulated as solid/hazardous wastes, while others, depending upon the type of waste generated and the recycling process used, are fully regulated.

* ***43 U.S.C. §§6901 et seq. and Solid Waste Disposal Act amendments of 1980, P.L. 96-482, 94 Stat. 2334.***

List of Hazardous Wastes

Hazardous waste streams from specific major industry groups and some generic sources (40 CFR, Part 261, Subpart D, §261.31 and 261.32) and well over 200 toxic commercial chemical wastes (i.e., discarded commercial chemical products and chemical intermediates) are included on the list of hazardous waste (40 CFR §261.33). If a commercial chemical substance is on the list, its off-spec species is also considered hazardous when discarded, as are spill residues. Some of the listed wastes are acutely toxic and are more closely regulated than other hazardous wastes [see 40 CFR §§261.33(e), 261.5(e), and 261.7(b)(3)].

Special Management Provisions

Small Quantity Generators

Small quantity generators are those that generate less than 1,000 kg per month of hazardous waste. There are two classes of small quantity generators:

1. Generators of between 100 and 1,000 kg per month that are subject to most of the requirements of 40 CFR Part 262 which apply to fully regulated generators, except that they are allowed to accumulate up to 6,000 kg of hazardous waste and to store waste for up to 180 to 270 days.

2. Generators of less than 100 kg per month that are exempt from regulation under 40 CFR Part 262 so long as they do not accumulate greater than 1,000 kg of hazardous waste, properly identify their waste, and comply with the less stringent waste treatment, storage and/or disposal requirements of 40 CFR §261.5.

Note that the classification of the generator is a function of the total wastes generated in a calendar month, not each waste stream. In addition, for acutely toxic wastes, if more than 1 kg per month of waste or 100 kg per month of spill residues are generated, all quantities of that waste are fully regulated.

Recycling or Reuse

The type of waste generated and/or the recycling process employed will determine whether recycled/reused materials are a solid/hazardous waste. Some of these materials are not considered solid wastes, some are solid wastes but not hazardous wastes, while others are hazardous but are not subject to full regulation, and still other of these materials are both solid and hazardous wastes that are fully regulated. The circumstances surrounding the apparent recycling/reuse of waste materials should be thoroughly documented during inspection.

Land Disposal Restrictions

A major feature of HSWA is the schedule for prohibiting the land disposal of untreated hazardous wastes. The key dates and statutory/regulatory requirements are as follows:

- May 8, 1985 - Landfilling of bulk or noncontainerized liquid hazardous waste or free liquids in hazardous waste is prohibited.

- November 8, 1986 - Land disposal of certain solvents, as well as dioxin containing hazardous wastes (F-series wastes) is prohibited unless treatment standards are met.

- July 8, 1987 - Land disposal of hazardous wastes list ed in Section 3004(d)(2) of RCRA (the "California list") is prohibited unless treatment standards are met.

- August 8, 1988 - Land disposal of 1st Third of listed hazardous wastes (primarily F and K wastes) is prohibited unless treatment standards are met.

- June 8, 1989 - Land disposal of 2nd Third of listed hazardous wastes (F, K, U, and P wastes) is prohibited unless treatment standards are met.

- May 8, 1990 - Land disposal of 3rd Third of listed hazardous wastes (the remaining listed wastes) as well as wastes exhibiting hazardous characteristics is prohibited unless treatment standards are met.

Requirements for Generators*

- **Identification** - Hazardous wastes must be identified by list, testing, or experience and assigned waste identification numbers.

- **Notification** - No later than 90 days after a hazardous waste is identified or listed in 40 CFR, Part 261, a notification is to be filed with EPA or an authorized State. An EPA identification number must be received.

- **Manifest System** - Implement the manifest system and follow procedures for tracking and reporting shipments. Beginning September 1, 1985, a waste minimization statement is to be signed by the generator [see RCRA Section 3002 (b)].

- **Packing** - Implement packaging, labeling, marking, and placarding requirements prescribed by DOT regulations (40 CFR, Parts 172, 173, 178, and 179).

- **Annual Report**- Submittal required March 1 using EPA Form 8700-13.

- **Exception Reports** - When generator does not receive signed copy of manifest from designated TSDF within 45 days, the generator sends Exception Report to EPA including copy of manifest and letter describing efforts made to locate waste and findings.

- **Accumulation** - When waste is accumulated for less than 90 days, generator shall comply with special requirements including contingency plan, prevention plan, and staff training (40 CFR, Part 265, Subparts C, D, J, and 265.16).

- **Permit for Storage More Than 90 Days** - If hazardous wastes are retained on-site more than 90 days, generator is subject to all requirements applicable to TSDFs and must obtain a RCRA permit.

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* *40 CFR Part 262*

Requirements for Transporters*

- **Notification** - No later than 90 days after a hazardous waste is identified or listed in 40 CFR, Part 261, a notification is to be filed with EPA or an authorized State. Receive EPA identification number.

- **Manifest System** - The transporter must fully implement the manifest system. The transporter signs and dates manifest, returns one copy to generator, assures that manifest accompanies waste, obtains date and signature of TSDF or next receiver and retains one copy of the manifest for himself.

- **Delivery to TSDF**- The waste is delivered only to designated TSDF or alternate.

- **Record Retention** - Transporter retains copies of manifest signed by generator, himself, and accepting TSDF or receiver and keeps these records for a minimum of 3 years.

- **Discharges** - If discharges occur, notice shall be give to national Response Center. Appropriate immediate action shall be taken to protect health and the environment and a written report shall be made to the DOT.

Requirements for Treatment, Storage, or Disposal Facilities (TSDFs)**

- **Notification** - No later than 90 days after a hazardous waste is identified or listed in 40 CFR, Part 261, a notification of hazardous waste managements activities is to be filed with EPA or an authorized State by TSDFs, which manage newly identified or listed hazardous waste.

- **Interim Status** - These facilities include TSDFs; on-site hazardous waste disposal; on-site storage for more than 90 days; in-transit storage for greater than 10 days and the storage of hazardous sludges, listed wastes, or mixtures containing listed wastes intended for reuse. Interim status is achieved by:

  - Notification (see above)

  - Being in existence on November 19, 1980 or on the date of statutory or regulatory changes which require the facility to have a permit

  - Filing a Part A by the date specified in the regulation covering the facility (40 CFR, Parts 261, 264, or 265)

* *40 CFR Part 263*
** *40 CFR Parts 264 and 265*

- **Interim Status Facility Standards** - The following standards and requirements shall be met.

- General information (Subpart B)
- Waste analysis plan
- Security
- Inspection plan
- Personnel training
- Handling requirements
- Preparedness and prevention
- Contingency planning and emergency procedures (Subparts C and D)
- Records and reports
- Manifest system
- Operating logs
- Annual and other reports (Subpart E)
- Groundwater Monitoring (Subpart F)
- Closure and post-closure plans (Subpart G)
- Financial requirements (Subpart H)
- Containers, tanks, surface impoundments, piles (Subparts I, J, K, L)
- Land treatment, landfills, incinerators, thermal treatment, chemical, physical and biological treatment (Subparts M, N, O, P, Q)
- Underground injection (Subpart R)

- **Permit** - In order to obtain a permit:

  - Facilities with interim status must file a Part B RCRA permit application when directed to do so by EPA or an authorized State and final facility standards must be met or the facility must be on an approved schedule to meet those standards.
  - New facilities and facilities which do not qualify for interim status are to receive a RCRA permit before construction can begin or a hazardous waste can be handled.

State Hazardous Wastes Programs

Under RCRA, states can obtain approval from EPA to implement programs governing hazardous wastes "in lieu of" the federal program administered by EPA. State programs must be "equivalent" to the federal program to obtain approval, and include the ability to enforce program requirements. Once approved the state standards govern all regulated entities and any assessment of a facility's compliance must be based upon those state regulations. Thereafter, when federal standards change, each authorized state must submit a revised program for EPA approval. Until such approval is received, those new standards generally do not have any effect in those states.

The major exception to this regulatory scheme is rule-making based upon the HSWA of 1984. HSWA provides that implementing regulations are to take effect at the same time in all states. Authorized states must still modify their programs to include HSWA requirements, but there is no gap in regulation between the time that the Agency promulgates a final HSWA-based rule and the time that the state receives final approval of the program revision which is equivalent to the federal HSWA rule. As a result, until a revised state program addressing all HSWA requirements is approved for an authorized state, the administration and enforcement of the overall hazardous waste program will involve both EPA and the authorized state.

Enforcement

EPA and authorized States may pursue enforcement actions based on administrative orders, as well as judicial actions seeking civil and criminal penalties for RCRA violations.

An administrative action involves issuance of an administrative order requiring compliance with the regulations. Injunctive relief may be sought in a civil action filed in the U.S. District Court. Civil penalties of up to $25,000 per day of violation may be imposed for violations of Subtitle C of RCRA. Failure to comply with an administrative order may result in suspension or revocation of a permit.

Criminal penalties of up to $50,000 and/or 2 years imprisonment may be imposed for certain "knowing violations." "Knowing endangerment" that places another person in imminent danger of death or serious bodily injury can result in a fine of up to $250,000 and/or 15 years imprisonment.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (SUPERFUND)

The Superfund Act was enacted December 11, 1980. The Federal government is authorized to clean up toxic or hazardous contaminants at closed and abandoned hazardous waste dumps and the government is permitted to recover costs of this cleanup and associated damages by suing the responsible parties involved. Cleanup monies come out of a "superfund" created by taxes on chemicals and hazardous wastes.

The act provides that, when there is a release of a hazardous substance, either real or threatened, the parties who operated the vessel or facility which created the release are liable for the containment, removal, remedial action, response, and injury damages to natural resources under Section 107(a). The act also establishes limitations on liability.

If claims are presented to the liable parties but are not satisfied, the act then allows claims to be reimbursed from the Superfund.

Regulatory provisions under Sections 102 and 103 of the act require that release of hazardous substances into the environment be reported unless the release is in accordance with an established permit. Spills of any "reportable quantity," established pursuant to regulations promulgated under the Act, must be reported.

All owners or operators of any facility handling and disposing of hazardous substances or that has handled hazardous substances in the past (including previous owners and operators) were required to inform the EPA Administrator by June 1981 of their facility activities unless they have a RCRA permit or have been accorded "interim status." Failure of notification is a crime and, if the party knowingly fails to provide these data, they are not entitled to the prescribed limits and defenses of liability.

On October 17, 1986, the Superfund Act was amended under the Superfund Amendments and Reauthorization Act (SARA). Those amendments provide mandatory schedules for the completion of various phases of remedial response activities, establish detailed cleanup standards, and generally strengthen existing authority to effect the cleanup of superfund sites.

Enforcement

Civil and criminal penalties and awards are available under CERCLA. Section 106 provides that failure or refusal to comply with an order directing immediate abatement of a release or threatened release of a hazardous substance which creates an imminent and substantial endangerment to the public health or welfare or the environment is punishable by a fine of up to $25,000 per day of violation. Section 109 also provides for penalties of up to $25,000 per day of violation, to be imposed by a U.S. District Court or in an administrative proceeding for failure or refusal to comply with other provisions of CERCLA.

Under Section 109(d), a "bounty" in the amount of up to $10,000 may be paid to any individual who provides information leading to the arrest and conviction of any person for a CERCLA violation.

Criminal penalties of up to $10,000 and imprisonment for 3 years are available under Section 103 for various violations, including failure to notify of a release and falsification of records. Second and subsequent violations may result in imprisonment of up to 5 years.

TOXIC SUBSTANCES CONTROL ACT

The Toxic Substances Control Act (TSCA) regulates existing and new chemical substances. TSCA applies primarily to manufacturers, distributors, processors, and importers of chemicals. TSCA can be divided into five parts as follows:

Inventory and Premanufacture Notification

EPA has published an inventory of existing chemicals. A substance that is not on this list is considered "new" and requires Premanufacture Notification (PMN) to EPA at least 90 days before the chemical can be manufactured, shipped, or sold (TSCA, Section 5). If EPA does not make a declaration within 90 days to restrict the product, then full marketing can begin and the chemical is added to the inventory. In addition, a manufacturer may obtain a test marketing exemption and distribute the chemical before the 90-day period has expired. Conversely, EPA, in response, may reject PMN for insufficient data; negotiate for suitable data, prohibit manufacture or distribution until risk data are available; or, pending development of a Section 6 rule, completely ban the product from the market or review the product data for an additional 90 days.

Testing

Under TSCA, Section 4, EPA can require product testing of any substance which "may present an unreasonable risk of injury to health or to the environment." Some testing standards are proposed, but no test requirements for specific chemicals are yet in effect.

Reporting and Recordkeeping

TSCA, Section 8(a) deals with general reporting. The "first tier" rule (PAIR) now in effect is a short form seeking production and exposure data on over 2,300 existing chemicals. A "second tier" rule is expected to obtain more detailed data on a relatively small group of chemicals that may become priority candidates for regulation.

Section 8(c) calls for records of significant adverse effects of toxic substances on human health and the environment. It requires that records of alleged adverse reaction be kept for a minimum of 5 years.

Section 8(d) allows EPA to require that manufacturers, processors, and distributors of certain listed chemicals (designated under 40 CFR 716.13) submit to EPA lists of health and safety studies conducted by, known to, or ascertainable by them. Studies include individual files, medical records, daily monitoring reports, etc.

Section 8(e) requires action upon discovery of certain data. Any person who manufactures, processes, or distributes a chemical substance or mixture, or who obtains data which reasonably supports the conclusion that their chemical presents a substantial risk of injury to health or to the environment, is required to notify EPA immediately. Personal liability can only be limited if the company has a response plan in effect.

Regulation Under Section 6

EPA can impose a Section 6 rule if there is reason to believe that the manufacture, processing, distribution or use, or disposal of a chemical substance or mixture causes, or may cause, an unreasonable risk of injury to health or to the environment. Regulatory action can range from labeling requirements to complete prohibition of the product. Section 6 rules are currently in effect for several chemical including PCBs. A Section 6 rule requires informal rulemaking, a hearing, and a cost-benefit analysis.

Imminent Hazard

This is defined as a chemical substance or mixture causing an imminent and unreasonable risk of serious or widespread injury to health or the environment. When such a condition prevails, EPA is authorized by TSCA, Section 7, to bring action in U.S. District Court. Remedies include seizure of the chemical or other relief including notice of risk to the affected population or recall, replacement, or repurchase of the substance.

Enforcement

Civil penalties may be assessed through administrative proceedings in an amount not to exceed $25,000 per day of violation. Appeals relating to civil penalties are reviewed in the U.S. Court of Appeals.

Criminal penalties for knowing and willful violations of TSCA may be imposed in amounts of not more than $25,000 per day of violation and/or imprisonment for up to 1 year.

Actions to restrain violations, compel compliance, or seize and condemn any substance, mixture, or article may be brought in the U.S. District Courts.

FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

A pesticide is defined as any substance intended to prevent, destroy, repel, or mitigate pests. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires registration of all pesticides, restricts use of certain pesticides, authorizes experimental use permits and recommends standards for pesticide applicators and the disposal and transportation of pesticides.

Pesticides are registered for 5 years and classified for either general or restricted usage. Restricted use means that they are to be applied either by or under the direct supervision of a certified applicator. Pesticides must be labeled and specify ingredients, uses, warnings, registration number, and any special use restrictions. Regulations also specify tolerance levels for certain pesticide chemicals in or on agricultural commodities. These limits apply to 310 different compounds and residue tolerances range from 0 to 100 ppm. A few pesticides are also regulated as toxic pollutants under Section 307(a) of the CWA and by Primary Drinking Water Standards under the Safe Drinking Water Act (SDWA).

Enforcement

FIFRA provides for relatively low penalties when compared with many of the other environmental statutes. Civil penalties range from as little as $500 for private applicators on a first offense, to not more than $5,000 per violation for registrants, commercial applicators, wholesalers, dealers, retailers, and distributors. Criminal penalties against private applicators are misdemeanors punishable by fines of not more than $1,000 and/or imprisonment for up to 30 days. Commercial applicators who knowingly violate FIFRA may be fined up to $25,000 and/or imprisoned for up to 1 year. Registrants, applicants for a registration and producers who knowingly violate this statute are subject to fines of up to $50,000 and/or imprisonment for up to 1 year.

Any person who, with intent to defraud, uses or reveals information relating to product formulas acquired pursuant to FIFRA's registration provisions may be fined up to $10,000 and/or imprisoned for up to 3 years.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986

The Emergency Planning and Community Right-To-Know Act (EPCRA) was enacted as a part of the Superfund Amendments and Reauthorization Act of 1986 as a freestanding provision to promote planning for chemical emergencies and to provide information to the public about the presence and release of toxic and hazardous chemicals in their communities. EPCRA is comprised of three subtitles: (1) Subtitle A, which establishes the framework for emergency response planning and release notification; (2) Subtitle B, which contains reporting requirements; and (3) Subtitle C, which contains general provisions, including enforcement, penalties, and trade secrets.

The Toxics Release Inventory, or TRI, is a publicly available database that contains specific toxic chemical release and transfer information from manufacturing facilities throughout the United States. This inventory was established under EPCRA.

Subtitle A - Emergency Planning and Notification

The goal of Subtitle A is to provide States and local communities with the information necessary to adequately respond to unplanned releases of certain hazardous materials. Through the establishment of State Emergency Response Commissions (SERC) and Local Emergency Planning Committees (LEPC), Subtitle A mandated the development and implementation of emergency response plans. Subtitle A also requires facilities at which certain "extremely hazardous substances" are present in excess of established threshold planning quantities to notify the State Commission of the presence of the substances and to report releases of those substances in excess of specified reportable quantities.

Subtitle B - Reporting Requirements

Sections 311 - 313 of EPCRA (Subtitle B) contain reporting requirements for facilities at which "hazardous chemicals" are present in excess of specified thresholds or which experience environmental releases of "toxic chemicals" in excess of the established threshold quantities.

Section 311 requires facilities at which "hazardous chemicals" are present in amounts exceeding threshold levels, to submit material safety data sheets (MSDSs) or lists of substances for which they maintain MSDSs to the SERC, LEPC, and local fire departments in order to give notice to those authorities of the types of potential hazards present at each facility.

Section 312 requires submission of annual and daily inventory information on the quantities and locations of the hazardous chemicals. "Tier I" reports provide the required general information. "Tier II" reports providing chemical-specific information must be submitted in place of Tier I reports upon request of the SERC, LEPC, or local fire department.

Section 313 requires annual reporting to EPA and the State of any environmental releases of listed "toxic chemicals" in excess of specified threshold quantities. A facility is required to submit a "Form R" Toxic Chemical Release Inventory Report in the event of a release if it has 10 or more full-time employees; is grouped in SIC codes 20 through 39, which include, among others: chemicals, petroleum refining, primary metals, fabricated metals, paper, plastics, and transportation equipment; and manufactures, processes, or otherwise uses a toxic chemical in excess of the established reporting thresholds. Thresholds for manufacturing and processing are currently 25,000 pounds for each listed chemical, while the threshold for otherwise use is 10,000 pounds per chemical. Reports for each calendar year are due by July 1 for the following year.

Facilities must provide identifying information, such as name, location, type of business, contact names, name of parent company, and environmental permit numbers; information about the manufacture, process, and use of the listed chemical and the maximum amount on-site during the year; release and transfer estimates for each environmental medium and type of transfer; locations of off-site transfers; and waste treatment methods and efficiencies.

Enforcement

Section 325 of EPCRA sets forth the civil, criminal, and administrative penalties which may be assessed for violations of that Act. Violation of an administrative order may result in civil penalties of up to $25,000 per day. Penalties for violations of the emergency notification provisions of Section 304 may be assessed through administrative or judicial proceedings, with potential penalties ranging from $25,000 per violation to $25,000 per day of violation. Any person who knowingly or willfully fails to provide emergency notification may be assessed a criminal penalty of up to $25,000 and/or 2 years imprisonment, ($50,000 and/or 5 years for second and subsequent convictions).

Violations of reporting requirements carry civil penalties of up to $25,000 per violation. Frivolous trade secret claims may result in penalties of up to $25,000 per claim, whereas the knowing and willful disclosure of actual trade secret information may be punishable by a fine of up to $20,000 and/or imprisonment up to 1 year.

APPENDIX G

Inspection Health and Safety Guidelines

INTRODUCTION

Importance of Preplanning
- Field personnel encounter a wide variety of potential hazards.
- Preplanning can reduce or eliminate many hazards.

Planning Process
- Research potential hazards.
- Evaluate the risks.
- Select appropriate protective equipment and clothing.

Sources of Information
- Plant personnel
- Agency files
- Agency employees
- Industry standard references

PRE-FIELD ACTIVITY EVALUATION

Planning Guide
- Prepare planning guide.
- Acquire pertinent medical records and other information.
- Take guide and information to the site.
- Leave a copy with your supervisor.

Components of the Planning Guide
- Activity location
  - name and address
  - contact name and telephone number
  - photographs
- Historical information
- Activity schedule
- Inspection personnel
  - names
  - restrictions
  - required training
- Lodging
- Hazards
  - transportation (distances, chemicals, supplies, t est equipment, etc.)
  - noise
  - fire/explosion
  - biological

- weather-related
- chemicals
- atmospheric
- thermal
- radiological
- confined space
- drowning
- physical and mechanical (height, machinery, etc.)

- Vehicles
- Required permits
- Emergency and rescue
  - communication (telephone, two-way radio, etc.)
  - warning signals (fire, evacuation, severe weather, etc.)
  - hospitals, emergency assistance personnel

- Personal protective equipment and clothing
- Miscellaneous

ONSITE EVALUATION

- Request a health and safety briefing.
- Conduct a walk-through survey.
  - hidden hazards
  - natural hazards

- Record unexpected hazards, additional gear requirements.

HAZARDS, EXPOSURE AND EVALUATION

- Inspectors will encounter a variety of physical, biological, and chemical hazards during inspections.

- Exposure to chemicals is the most common and significant health hazard field personnel encounter.

- Chemicals may be hazardous because they are toxic, flammable, combustible, explosive, corrosive, reactive, radioactive, biologically active, or some combination of these and other characteristics.

- Inspectors should learn basic first aid techniques.

SAFETY GUIDELINES AND TECHNIQUES

- Lifting and carrying
- Ladders and climbing
- Power sources and electrical equipment
- Confined spaces
- Mechanical hazards
- Biological hazards

Lifting and Carrying

- Assess the following:
  - overall weight
  - distribution of weight
  - security of contents
  - distance
  - obstacles
  - surface conditions
  - visibility
- Use two people.
- Lift with power of leg muscles.
- Do not climb ladder with heavy load.

Ladders and Climbing

Portable Ladders

- Inspect ladders for hazards.
- Position ladder base 1/4 of working length from wall.
- Use only ladders with non-skid feet; be sure ladder rests on non-slip level surface.
- Wear appropriate clothing.
- Do not use:
  - step ladders >6 m (20′)
  - straight ladders >9 m (30′)
  - two-section extension ladders >15 m (48′)
  - three-section extension ladders >18 m (60′)

- Face ladder when climbing and descending.
- Have someone stabilize bottom.
- Do not hand carry anything up the ladder.
- Prevent tools and equipment from catching on ladder or falling.
- Do not use ladder as scaffold or bridge.
- Do not permit more than one person on ladder.
- Do not reposition ladder while on it.

Fixed Ladders

- Minimum design load: 91 kg (200 lbs)
- Evenly spaced stepping surface ≤ 30 cm (12″)
- Adequate clearance
- Minimum 18 cm (7″) clearance behind each rung
- Safety devices or cages: >6 m (20′)
- Pitch: 75°-90°

Working Surfaces

- Check integrity of elevated platforms before climbing up to them.
- Discontinue inspection if personal safety is jeopardized.

Power Sources/ Electrical Equipment

- Shut off power where possible.
- Remove highly conductive equipment if power cannot be shut off.
- Wear protective gear - hard hats, gloves, etc.

Electrical cords/plugs

- Inspect periodically and repair.
- Use three-wire equipment.
- Ensure continuity of grounding wire.
- Ensure diameter of wires is sufficient to prevent loss of voltage or overheating.

Uninsulated Electrical

- Ensure exposed metal parts of electrical equipment are grounded.

Conductors or Metal Parts

- Use a Ground Fault Circuit Interrupter (GFCI) in the line.

- Use double-insulated power tools.

Static Electricity

- Sources include:

  - particulates in process stream
  - electrostatic precipitators
  - lightning

- Safety precautions:

  - ground sampling probes
  - be aware of weather conditions
  - discontinue sampling where lightning hazard exists
  - use A.M. radio for weather reports/static interference

Mechanical Hazards

- Remotely controlled vehicles
- Forklifts
- Potential entanglements

Confined Space

- See booklet for information on confined space entry.

Biological Hazards

Entering certain locations can be hazardous due to the presence of various biological hazards.

Ticks

- Live in areas with tall grasses, bushes.
- Burrow into skin and suck blood.
- Transmit Rocky Mountain Spotted Fever, Lyme's Disease.
- Wear light-colored clothing; tuck pant legs into socks.
- Examine body for presence of ticks.
- Seek medical help if fever, rash or bull's eye pattern develops.

Snakes

- Learn to recognize poisonous varieties.
- Wear knee-high, thick, leather boots and leather gloves.
- Be aware of their habits.
- Bring snake bite kit.

- To treat snake bite:
  - keep victim calm
  - slow circulation
  - use snake bite kit

- get immediate medical help

Spiders
- Learn to recognize dangerous varieties.
- Get medical help for bites as soon as possible.
- Tarantula bites are painful but seldom serious.

Bees/wasps
- Recognize their habitats.
- Carry bee-sting kit if allergic.
- To treat sting:

  - keep victim calm
  - remove stinger
  - cool area with ice
  - administer cardiopulmonary resuscitation (CPR) if necessary
  - seek medical help

Scorpions
- Usually found under other objects.
- Carry anti-sting kit - sting can be fatal to allergic individual.
- Administer CPR if necessary.
- Seek medical help if stung.

Rabid Animals
- Can infect any warm-blooded animal (foxes, dogs, bats, raccoons, skunks, squirrels).
- Animals may exhibit lack of fear, aggressiveness, dropping head, peculiar trotting gait, unusual behavior.
- Seek immediate medical help if bitten by rabid animal; infection nearly 100% fatal if untreated.

Microorganisms
- Harmful bacteria, viruses and fungi can be found in soil, waste water, medical and pharmaceutical waste.
- Inspectors should avoid direct contact with these materials.

APPENDIX H

Inspection Guide and Report Format

I. General Information

Report Prepared By: ______ Date: ______
Report Submitted To: ______
Date of Inspection: ______
Type of Inspection: ______
(e.g. FYxx Overview
Inspection, FYxx EPA
Permit Inspection

II. Source Information

Company Name: ______
Plant Location: ______
Mailing Address: ______

Source Contacts: ______
SIC Code and Description: ______
AFS No: ______ AFS Class: ______
Local Non-Attainment Areas: ______
Applicable Air Programs: ______
Issue Date of State/EPA PSD Permit: ______
Permit Expiration Date: ______
Date of Last Source Test: ______
Results of That Test: ______
(Compliance/Non-Compliance)
Applicable Federal Regulations: ______
Source Emission Inventory: Actual Emissions (Tons / Year)

TSP	SO_2	CO	VOC	Reference

Summary of Enforcement Actions:

Date	Action Taken	State/EPA	Violation

Comments: ______

Inspection Guide and Report For

____

(Company Name)

III. Processes Evaluated and Test Data

Control Equipment and CEM Data

Emission Point	Method	Pollutant	Process Conditions	Control Equipment	CEM ID

CEM Performance Specification Tests

Date	Emission Point	Pollutant	Passed/Failed

Source Tests & Compliance Status

Emission	Method	Pollutant	Process Conditions	Allowable	Actual Emissions

IV. Applicable Regulations

Regulation or Permit No.	Emission Point	Pollutant	CEM (Y/N)	Allowable Emissions

Inspection Guide and Report For

____
(Company Name)

V. Source Inspection

Date/Time: ________________________________

Weather: ________________________________

Names of Participants: ________________________________

Inspection Notes and Narratives

Entrance Interview ________________________________

On-site Interview ________________________________

Exit Interview ________________________________

Description of Sampling ________________________________

Additional Information Requested ________________________________

Other Data and Observations

Does Company Keep Any:

Operating Logs ________________________________

O & M Records on Process or Controls ________________________________

Inspection Guide and Report For

(Company Name)

VI. Findings and Recommendations

VII. State Inspection Report Review (If Applicable)

APPENDIX I

Potential Modifications at Wood Panel Facilities

Based on information that has been received from a variety of wood panel facilities, the following is a partial listing of modifications that wood panel facilities may be engaged in which have the potential of affecting the total emissions at wood panel facilities. Whether these modifications will increase or decrease the facility's total plant emissions depends on the particular situation at the facility. The purpose of this list is to draw attention to the changes and to flag the potential impact to the facility's overall plant emissions.

Change in:

boiler fuel type (i.e. natural gas, oil, wood)
dryer heat delivery system
dryer fuel type
drying method (i.e direct, indirect, jet)
heat delivery system for dryer or press (i.e. RF/microwave)
wood species

Expansion of

boiler capacity/size
dryer capacity (including the addition of sections)
press capacity (including the addition of press openings)

Installation of

boiler
dryer
automation of dryer controls(temperature, moisture)
finishing equipment
in-line dryer condensate header
kiln/vat/pond controls
kilns/ponds/vats
predryer
press
automation of the press
redryer
sander
saw

Modification of

dryer jets and belts
feedstock/process material handling
glue formulation (including the adoption of high-moisture resin)
raw material handling

conveyor line automation